DISSERTATION

RIVER RESTORATION AND DAM REMOVAL IN THE AMERICAN WEST: AN EXAMINATION OF POLICY CHANGE ACROSS POLITICAL JURISDICTIONS

Submitted by

Bradley T. Clark

Department of Political Science

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Spring 2007

COLORADO STATE UNIVERSITY

December 8, 2006

WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY [BRADLEY T. CLARK] ENTITLED [RIVER RESTORATION AND DAM REMOVAL IN THE AMERICAN WEST: AN EXAMINATION OF POLICY CHANGE ACROSS POLITICAL JURISDICTIONS] BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

Committee on Graduate Work

Charles E. Davis, Advisor

Sandra K. Davis

Robert J. Duffy

Mark Fiege

William Chaloupka, Department Chair

ABSTRACT OF DISSERTATION

RIVER RESTORATION AND DAM REMOVAL IN THE AMERICAN WEST:

AN EXAMINATION OF POLICY CHANGE ACROSS POLITICAL JURISDICTIONS

The engineering of water resources has largely defined the advance of civilization in North America. For various purposes, this development has continually expanded, with emphasis on societal benefits often at the expense of ecological considerations. The heyday of dam building ended by the mid-1960s, with the largest structures being completed. Since then, environmental and social impacts have mounted in severity and scope. For decades, research from the natural sciences has documented many negative ecological impacts from the damming of rivers. More recently, a political movement to restore rivers and natural resources has grown and prompted numerous changes to traditional polices of river development. This dissertation's focus is dam removal, an example of such policy change, and means to restore rivers in the western US. The theoretical perspective offered by Lowry (2003) is utilized to examine policy change and explore the political dimensions of dam removal. Key variables include the degrees of political receptivity and physical complexity of proposed dam removals. Specific attention is on the three federal jurisdictional contexts in which the political debates unfold; these include dams under the direction of the US Army Corps of Engineers; the US Bureau of Reclamation; and nonfederal hydropower dams regulated by the Federal Energy Regulatory Commission. A detailed case from each context examines the political dynamics and address the question of why dams in some contexts have been removed or are slated for removal, while others have not. A fourth, intergovernmental

context is also considered for dams under the primary jurisdiction of a state or local administrative agency, albeit with notable federal influence and/or involvement. Broad research questions include: How do the politics of dam removal play out in different political jurisdictions? Are dramatic versus less dramatic types of policy change more or less likely in various contexts? This research finds that major policy change can occur, not only within federal administrative contexts in the West, but for cases when political receptivity is low and physical complexity is high.

Bradley T. Clark

Department of Political Science

Colorado State University

Fort Collins, CO 80523-1782

Spring 2007

Table of Contents

CHAPTER 1

"What we need, is a new culture in which politicians and the destruction of dams go together" – Former Interior Secretary, Bruce Babbitt.

Introduction

The damming and engineering of rivers and streams have been central to the advance of civilization in North America. The development of water resources has continually expanded to achieve a host of interrelated goals; emphasis was oftentimes on societal benefits, at the expense of ecological considerations. The heyday of dam building ended during the middle decades of the twentieth century, with completion of the largest structures.[1] Since then environmental impacts have mounted in severity and scope. For decades, research from the natural and biological sciences has documented a series of negative ecological impacts caused by the damming of rivers. More recently, a political movement to restore rivers and conserve their natural and cultural resources has grown and prompted a number of changes to traditional polices of river development and management.

This dissertation focuses on dam removal, as an example of such policy change intended to restore rivers and related resources. And while other examples of policy change in this domain exist, the policy option to remove a dam for environmental and/or social concerns, even though it continues to produce tangible social benefits, is the most fundamental and lasting means of river restoration. Instances of less permanent and drastic policy changes have provided for structural modifications and development of fish-friendly technologies; simulated seasonal flows and flooding; and increased hatchery production. Despite these developments, lasting ecological improvements to most dam-

obstructed rivers have been mixed and scores of threatened and endangered species face uncertain futures. Indeed, the decision to intentionally remove or breach an existing dam represents the most permanent (and oftentimes least costly and most effective) policy option to ensure river restoration and resource conservation.[2] As such, this current expression of policy change warrants independent examination.

Method

An expanded version of the theoretical perspective offered by Lowry (2003) is utilized to examine this broad policy shift that has prompted the restoration of selected rivers. Of specific interest to this dissertation are the political dimensions of dam removal and how these may vary across administrative or jurisdictional contexts. Key independent variables include the degrees of both political receptivity to policy change and the physical complexity of proposed undertakings. Detailed analysis is regionally focused on cases of river restoration involving dam removal in the American West.

Purpose: Regional Focus

The regional focus is intended to address a number of perceived shortcomings in existing literature. First, previous studies have examined policy change and dam removal from either a broad, nationwide perspective (e.g., Lowry, 2003; Grossman; 2002; Aspen Institute, 2001; Bednarek, 2001; Kerwin, 1990) or a statewide or local perspective (e.g., Clark, 2004; Pejchar and Warner, 2001; Born et al., 1998 Hart, 1992). These and other seminal studies have indeed produced valuable findings and informed subsequent research. However, the general conclusions gleaned from nationwide studies tend to suggest that there is a single American "politics" of river restoration through dam removal; lasting and dramatic policy changes are likely to emerge only in limited regions

or climates of the country, such as the Northeast and upper-Midwest. In addition, existing studies conducted at the state or local level, with a focus on intergovernmental relations, have yet to organize analysis on a larger, regional basis.

In the most complete study to date (e.g., Lowry, 2003), the level and magnitude of policy change is documented from East to West across the US. Accordingly, discussion progresses from the least complex situations where dam removal has occurred to the most complex cases of river restoration where dam removal has not occurred. In this sense, rivers obstructed by small-scale dams in states such as Maine and North Carolina generally involve less complex undertaking than those in the West, with the multiple purposes of water storage, hydropower, drinking water, flood control, navigation, and recreation – especially when such purposes are intimately linked to one-hundred-plus-foot-high structures, impounding vast reservoirs. Add to this the generally arid climate common to most of the western US (when compared to the predominant conditions in the East), and the dams on western rivers appear to embody the term "complexity". Why not remove this source of influence and focus solely on the arid western US, where "dam politics" are arguably an entirely different beast when compared to the more humid East?

Purpose: Jurisdictional Focus

"From a political perspective, dams fit into three categories: 1) those that are federally owned, e.g., by the U.S. Army Corps of Engineers, DOI/Bureau of Reclamation, Tennessee Valley Authority; 2) those that are regulated by the federal government, e.g., Federal Energy Regulatory Commission-licensed projects; and 3) those that are neither owned nor regulated by the federal government, e.g., state owned" – Policy Statement on Dam Removal from the American Fisheries Society (AFS) (2005).

In addition to region, the selection of case studies and analyses in this dissertation are based on the three primary jurisdictional or administrative contexts at the federal level

in which the politics of river restoration and dam removal primarily unfold. As the above statement suggests, these include federal dams built and administered by the US Army Corps of Engineers (ACOE) and US Bureau of Reclamation (BOR), and nonfederal hydropower dams licensed and regulated by the Federal Energy Regulatory Commission (FERC). An in-depth case study from each context is examined to draw-out and compare the unique political dynamics and assess the variation within the politics of policy change involving river restoration through dam removal.

In addition, a fourth administrative context, termed "intergovernmental", is considered for dams under the primary jurisdiction of a state or local regulatory agency, albeit with some notable federal influence and/or involvement.[3] Thus, in addition to the three primary federal contexts of dam removal, where agency decisionmaking is more autonomous in an intergovernmental context, this fourth jurisdictional context is less-defined or circumscribed; there is an inevitable flow of resources and influence from federal entities to state and local administrative contexts. This intergovernmental context involves dams currently owned by state or local government entities; regulatory oversight in terms of environmental protection and/or public safety remains principally a state-level prerogative yet is inherently influenced through intergovernmental relations with relevant federal contexts.[4] As such, a secondary aspect of this analysis regards the extent of influence exercised by federal agencies (principally ACOE, BOR, and FERC) on the politics of river restoration and removal of dams owned and operated at the state and local levels.[5]

Commonly, this intergovernmental influence from the federal context(s) is evidenced through feasibility studies, environmental analyses, transmission of technical

and engineering data, other forms of in-kind (e.g., non-monetary) contributions, and/or provision of some degree of mixed funding. And while a single case study from any one of the thirteen western states cannot be expected to wholly capture the richness and variation regarding the intergovernmental dimensions of dam removal in the American West, a review of various cases does provide some general political portrait of the intergovernmental context.[6]

Beyond this intergovernmental perspective – which is a secondary aspect of this dissertation – the broader focus on jurisdiction stems from an additional perceived shortcoming in existing literature; specifically, insufficient rationale has been given for case study selection in terms of an underlying dimension or unifying theme (e.g., Lowry, 2003; Grossman, 2002). In these studies, analysis was based on regionally-disparate cases from any variety of political jurisdictions. This dissertation takes a much closer look at the unique political or administrative jurisdictions that are the primary venues for specific cases of river restoration and dam removal.

By systematically examining policy change among cases involving dam removal that are differentiated by unique jurisdictional contexts, this dissertation presents a more detailed and nuanced understanding of the political dynamics of policy change. This allows for important comparative insights across the different contexts in which the politics of river restoration and dam removal transpire. From this perspective, the focus is on whether jurisdictional context plays an independent role in determining the likelihood of dam removal as a viable output of policy change to traditional river management. Broad research questions include the following. How do the politics of dam removal transpire in different political jurisdictions? Are dramatic versus less

dramatic types of policy change more or less likely in specific administrative contexts? How do the variables of political receptivity and physical complexity affect policy change across political jurisdictions? How do intergovernmental relations affect river restoration and dam removal at the state and local levels?

The qualitative case analyses in forthcoming chapters are supplemented with a general quantitative analysis as an appendix to the final chapter. This quantitative supplement uses specific variables to assess the variation in cases of policy change involving restoration of dam-obstructed rivers from across a much larger sample size. Specifically, an index of actions on dams is constructed; this ranges from 'no action' – to 'some structural modification' – to 'outright removal'. In addition to jurisdictional context, the independent variables used to assess this variation are based on those employed in a similar quantitative analysis by Lowry 2003, 250-252.

And while the pioneering work of Lowry (2003) contributed immensely to the policy change literature, specifically in terms of river restoration and dam removal, more recent decisions to remove larger and more contested dams raise new questions. In some respects, a host of recent decisions to remove selected dams challenge existing theories of policy change and dam removal.[7] Specifically, the mere fact that the policy option of dam removal has been chosen to restore rivers, such as Washington's Elwha, Montana's Clark Fork, and others, seems to defy the otherwise commonsensical and rational proposition of Lowry (2003); that a lack of political willingness coupled with the physical complexities of removing dams will prevent dramatic policy change from transpiring. In addition, existing explanations for dam removal, and specifically variation among cases, have yet to focus squarely on jurisdictional context as a distinguishing

feature. Herein lays the impetus for this dissertation – the search for a greater understanding of the political and jurisdictional dynamics of river restoration through dam removal.

Outline of Work

Chapter 2 begins with a broad historical overview of water development and the damming of rivers in the American context; the socioeconomic benefits and socio-ecological costs of this development are also considered. Next I discuss the primary factors behind the genesis of the dam removal and river restoration movement. Third, a general discussion is offered on the diffusion of policy change involving dam removal throughout the United States; this includes a brief consideration of precedent-setting cases. Discussion is then offered on policy change and termination and how these two related phenomena may transmit via the processes of policy diffusion, perhaps most notably in the intergovernmental context of state and local dams. The chapter concludes with an examination of the differential jurisdictional responses to the dynamics of policy change in general, and dam removal specifically. This includes discussion over the intergovernmental context and the extent of involvement on behalf of the three federal entities in the politics of dam removal at the state and local levels. Brief attention is given to a selection of cases of river restoration through dam removal where dimensions of intergovernmental involvement are notable.

In Chapter 3, the larger context of policy change is reviewed. A discussion on the existing model of Lowry (2003) is then discussed and a series of additions to his theoretical perspective are proposed. This ultimately leads to a discussion of ways in which an enhanced understanding of dam removal politics may emerge. In the second

section, the research design and methodology used in this dissertation are presented. The chapter closes with discussion over the selection of case studies analyzed later in the work.

Chapters 4 – 6 describe in detail the three federal jurisdictional contexts in which the politics of river restoration and dam removal primarily unfold. Specifically, the two executive agencies in the federal context (e.g., the ACOE and BOR) are discussed in Chapters 4 and 5 and the independent regulatory agency in the federal context (e.g., FERC) is discussed in Chapter 6. In each of these chapters, the following areas relative to the individual jurisdictions are considered; these include the history of the primary agency involved; how it was both impacted by the mainstream environmental movement and responded to subsequent legislation; its environmental programs and dam-related activities today; and its prospective operations in the twenty-first century. Discussion in these areas highlights the unique dimensions of each jurisdictional context and provides the broad empirical context for the subsequent case study analyses. In addition, Chapters 4-6 are each brought to a conclusion with a general description and chronological account of the case study selected to examine each jurisdictional context.

In Chapter 7, the individual case studies involving the three federal jurisdictional contexts are analyzed and compared relative to the general findings and hypotheses offered by Lowry (2003). The relevancy of the additions to Lowry's framework proposed in this dissertation is then assessed in each context. Lastly, a comparative analysis and general conclusion are offered regarding the utility of the framework's components across jurisdictional context. This includes a brief discussion of the intergovernmental context.

In Chapter 8, generalizations beyond the cases examined in this dissertation are offered. Based on the findings specific to each jurisdictional context, research expectations are offered on how restoration and dam removal efforts on other rivers across the West may transpire. A brief quantitative assessment is then offered regarding the variation in outcomes among cases of dam removal and river restoration across a much larger sample size. Do the political dynamics unique to specific administrative contexts determine the likelihood for dramatic and fundamental policy changes, such as dam removal? In the current era of river restoration, will policy change in support of dam removal continue to transpire across political jurisdictions and diffuse across the entire western US and beyond? How might intergovernmental relations affect future policy changes involving restoration and dam removal?

Notes

[1] 3,123 dams were completed in 1960; this is the largest number of dams completed in a single year (NPDP, 2006).

[2] "Removal" implies the complete removal of a dam's structure, while "breaching" refers to the partial deconstruction (usually removal of the earthen sections, while the concrete portions remain) in order to provide for an unimpeded and faster flowing river.

[3] Federal involvement in the intergovernmental context may also serve to halt the initial construction of proposed dams. For example, the US EPA vetoed the necessary "404 permit" required under the CWA for dredge-and-fill activities in rivers for the Two Forks Dam proposed by the Denver Water Board. This veto came on November 23, 1990, two years after the US ACOE granted the authorizing permit (Nichols, et al., 2001).

[4] Via their managerial capacities, consolidated expertise, and paramount role in the implementation of regulatory policies and programs, administrative agencies occupy a vital role in the environmental policy landscape at the state and local levels (Lester, 1994; Rinquist, 1993). And while the federal government owns and operates the majority of large hydropower dams in the US, it owns a mere 3% of the more than 79,000 smaller dams identified by the ACOE (Grossman, 2002). State and local government on the other hand, account for approximately 22% of the ownership of these dams[4] (Grossman, 2002). Yet despite this comparatively large percentage of nonfederal ownership and administration, there exist varying degrees of interagency and intergovernmental involvement related to feasibility studies, technical data, funding sources, and/or the implementation of actual dam removals.

Notwithstanding, in regards to regulatory federalism in an environmental context, the states have generally preferred for the federal government to leave state administrators with enough discretion to adapt federal environmental regulations to unique local conditions and to be responsive to local political and economic interests (Rosenbaum, 2005; Lester 1994). And some states, such as California, have been proactive in

addressing environmental issues and indeed, have anticipated federal policymakers by initiating innovative regulatory programs and passing comprehensive environmental statutes.

In an effort to capture the relative levels of efficacy and capability present in state-level bureaucratic environments, Lester (1994) divided the states into four groups based on their dimensions of commitment to environmental protection and institutional capability. In the West, the states of California, Oregon, and Washington were grouped with the "Progressives", representing those with a high commitment to environmental protection and strong institutional capabilities with the bureaucracy. Coupled with their states' enduring liberal orientation (especially California), this "Progressive" type of bureaucratic landscape seems to foster a political climate conducive to advancements in environmental and resource-protection policy. And indeed, since 1990, no other states beside Wisconsin and Pennsylvania have removed more dams than California (American Rivers et al., 1999). In this sense, the state of California may be fulfilling the role as a "laboratory of experimentation" through its initiatives to remove selected dams.

Also in the West, the states of Montana and Hawaii fell into the second group, the "Strugglers", which subsumes those with a strong commitment to environmental protection but with limited bureaucratic capabilities. Accordingly, states falling into this category were said to be often willing, but unable to aggressively and effectively pursue the adoption of environmental protection policies. The remaining western states, representing those with a generally low commitment to environmental protection, were grouped in the final two groups; Alaska was placed with the "Delayers" despite its strong institutional capacity for environmental regulation, and Arizona, Colorado, Idaho, Nevada, New Mexico, Utah, and Wyoming were grouped with the "Regressives" due to their purported weak institutional capacities and limited commitment to environmental protection. Therefore according to Lester's (1994) typology, it is unlikely that the majority of western states will be able and will to adopt dam removal policies associated with river restoration and will presumably continue to promote economic development at the expense of environmental quality.

[5] For a detailed discussion on intergovernmental relations, federal-state working relationships, and federalism (generally) in the context of environmental policy, see Scheberle (1997).

[6] The thirteen western states include Alaska and Hawaii, yet these receive little-to-no treatment in this dissertation. For the remaining eleven western states, variations in terms of partisanship, economics, legislative professionalism, and bureaucratic capacity work against the likelihood that a single case study in an individual state could represent the intergovernmental context for all.

[7] Other than the Elwha Dams, decisions to remove dams of unprecedented size and complexity include; Condit Dam on Washington's White Salmon River, Milltown Dam on Montana's Clark Fork River; and the Irving/Childs Dam on Arizona's Fossil Creek.

CHAPTER 2

I. Historical Overview of Water Development

"The US has been building, on average, one large dam a day, every single day, since the Declaration of Independence" – Babbitt (1998).[1]

The strategic use and manipulation of water resources have evolved in-line with the advance of human settlement in North America. Archeological evidence suggests extensive networks of water supply and diversion by Native Americans; subsequent European arrival coincided with the engineering and damming of waterways in the modern-day Northeastern United States. New modes of transportation were established, as canals and reservoirs were built. Farms and ranches were irrigated and industries utilized water-driven mechanical power. The 'working river' concept was thus born; regional river systems were regimented and harnessed in order to facilitate economic growth and fuel industrial development. In addition, rivers were often re-channeled and floodplains and estuaries drained to curtail flooding and facilitate civic planning. Certainly many sections of free-flowing rivers and streams were obstructed and lost to reservoirs and water diversions, but these modest losses were widely considered offset by the social and economic benefits of dams (McCully, 1996; Grossman, 2002).

As the decades progressed and the inner-compass of American society pointed farther West, so too did the development of water resources – in a manifestly destined direction. In California, the Gold Rush prompted the emergence of a doctrine of water allocation as competition expanded for the use of rivers and streams. As increasing numbers of homesteaders crossed into the arid and semi-arid lands west of the one-hundredth meridian, policymakers soon realized that large-scale manipulation of water resources was necessary to both develop the continent's resources and advance the type

of civilization that had developed along river systems in the East and Midwest (Worster, 1985; Wilkinson, 1992). More people, new towns, and the expansion of agriculture, ranching, and mining combined to create an ever-growing demand for water. Across the West, water resources were harnessed and diverted to meet this demand along with the surge of urban and industrial development in the region's often-arid landscapes. Yet because the main rivers in the West are more widely scattered than those in the East and often flow vigorously through forbidding landscapes or inaccessible canyons, continued water development would necessarily assume a much grander scale, cost, and unprecedented level of government involvement (Worster, 1985).

The US would come to lead the world in dam building by the dawn of the twentieth century and during the next fifty-odd years, virtually every major river system across the continent would be strategically blocked with dams; straightened by levees; and/or significantly diverted by elaborate systems of canals and aqueducts (Grossman, 2002). A recent estimate suggests that a total of roughly 2.5 million dams currently span the nation's waterways (NRC, 1992). Of these, the ACOE has constructed 383 dams and reservoirs; the BOR accounts for an additional 600 (US ACOE, 2005c). The ACOE's National Inventory of Dams (NID) lists some 79,000 other dams (greater than twenty-five feet in height or fifty acre feet in storage) and the agency has identified tens of thousands of smaller dams on tributary rivers across the country (ASDSO, 2006a). [2] As a cumulative result, less than one-percent of America's rivers currently exists or is protected in their natural state; roughly 600,000 miles of previously free-flowing rivers sit stagnant behind dams (Grossman, 2002).

The Birth of a Movement

"These days, some of the prime opportunities are in restoring, not structuring, rivers" (Lowry 2003, 50).

Throughout America's history of river development, it was widely believed that the adverse environmental and social consequences of damming and engineering rivers were minimal. Instead, the socioeconomic benefits of such development were expounded; they were celebrated as examples of Americans' ingenuity and progress. Yet as the dams and associated water diversion structures have aged, an understanding of the many deleterious ecological and social impacts has mounted. Recognition has grown that the benefits of dams may fail to justify their long-term costs; within the past few decades, the sheer logic and efficacy of dams have been reevaluated and river restoration and dam removal movements have been born. To many, it has become clear that the ecological damages associated with the building of a single dam can extend the entire length of a river and beyond, affecting the surrounding forests and watershed, and damaging nearby estuaries, beaches, oceans, and biodiversity on regional bases. According to former US Interior Secretary Bruce Babbitt,

"The public is now learning that we have paid a steadily accumulating price for these projects [dams] in the form of fish spawning runs destroyed, downstream rivers altered by changes in temperature, unnatural nutrient loads and seasonal flows, wedges of sediment piling up behind structures, and delta wetlands degraded by lack of fresh water and nutrients, and saltwater intrusion. Rivers are always on the move and their inhabitants know no boundaries; salmon and shad do not read maps, only streams." [3]

For decades, the sheer idea of dam removal was widely considered a fringe, radical approach to river restoration. It conjured images of the characters' efforts to bring down Arizona's Glen Canyon Dam in Edward Abbey's infamous work, *The Monkey Wrench Gang*. Recently however, this perception of dam removal or breaching has

changed; these approaches are often considered reasonable and the most cost-effective methods of river management and ecosystem restoration (American Rivers et al., 1999; Grossman, 2002; Heinz Center, 2002). Subsequent momentum has mounted to remove selected dams; the search has begun for the most effective and efficient means of dam removal and restoration of the rivers they impound.[4]

II. Factors Driving Dam Removal

A number of general factors associated with this change in perceptions about dams in the larger sociopolitical context have been put forward (e.g., Pope, 1987; Feldman, 1991; Wilkinson, 1992; McCully, 1996; Born et al., 1998; Friends of the River, 2000; Pejchar and Warner, 2001; American Rivers, 2001, 2005a; Grossman, 2002; Heinz Center, 2002; Aspen Institute, 2002; Bowden, 2003; Lowry, 2003; Orr et al., 2004; McCool, 2004; Clark, 2004). Cumulatively, these have led to increasing questions over the sheer rationality and value of dams from a variety of standpoints; including ecology, hydrology, economics, politics, energy production, human rights, and safety.[5] And while the initial scrutiny came from the natural and biological sciences, social scientists have begun examination into a variety of dimensions related to dam removal (e.g., Born et al., 1998; Aspen Institute 2001; Lowry, 2003; Orr et al., 2004; Clark, 2004). Such forces have prompted a reassessment of policy priorities; indeed, a number of policy changes to recreate more natural ecosystems and conserve natural and cultural resources have emerged in many political contexts (Lowry, 2003).[6]

Environmental and Social Concerns

In the forty-odd years since the end of the dam building spree, numerous species of native diadromous fish and other aquatic species, once thought to be infinitely

abundant, have become extinct and many more are in decline.[7] This includes both catadromous species (e.g., those which hatch in freshwater and migrate to sea to spawn – such as the American eel) and anadromous species (e.g., those which hatch in freshwater, migrate to the sea, and return to freshwater to spawn – such as salmon or steelhead trout). Conservation efforts for many of these remain tenuous, as dams continue to block ancestral spawning venues in many coastal river basins.

In many interior river basins, riparian habitats and biological systems downstream of dams have been significantly altered by sediment deprivation and changes to temperature and seasonal flows. Native species are often ill-equipped for survival in the post-dam river environments; predation and competition for resources with introduced species further compromise conservation efforts.[8] Upstream landscapes have been inundated by reservoirs; their usability is gradually and prematurely diminished by silt accumulation. In addition, dammed and engineered rivers have compromised the livelihoods and traditional practices of various Native American tribes, and many reservoirs have flooded cultural and archeological sites.

In many states, the most immediate factor driving dam removal is the federal mandate under the Endangered Species Act; specifically to revive diadromous fish populations that have long been blocked by dams from historical spawning areas (Pejchar and Warner, 2001). In the Columbia and Snake River basins, an estimated 95% of juvenile salmon fall victim to either dam turbines or predator-laden conditions in reservoirs behind eight large federally-owned dams and countless federally-regulated and state-owned dams (Clark, 2004). Scores of smaller dams on other rivers such as the Rogue and Deschutes further hinder conservation efforts across the Northwest where

there are currently twenty-one populations of native fish listed as threatened or endangered. A twenty-second population is currently listed as "proposed threatened" (US FWS, 2006).[9] In addition, smaller dams along the Pacific coast continue to prevent the passage of federally-listed runs of salmon and steelhead trout. In fact, the genetic uniqueness of steelhead in southern California from populations farther north prompted their listing (endangered) in 1997. Dams also hinder conservation efforts for non-anadromous native fish species such as the threatened Bull trout in Montana's Clark Fork River; the state's largest and one of the largest river systems in the Columbia River basin (CFC, 2006).

Safety

From a public interest standpoint, a primary concern regards the safety of existing dams.[10] Fundamentally, dams age at different rates and in a variety of ways, depending on a range of site-specific circumstances (McCully, 1996). As a result, particular dams may remain safe and functional for a hundred years – or longer, while others may begin to crack and leak after less than a decade. Globally, some 5,000 large dams are now more than fifty years old, and both the number and size of the dams reaching their half-century mark (the average life expectancy for dams) is rapidly increasing (McCully, 1996). More than thirty-percent (22,000) of dams in the US officially listed by ACOE have surpassed this fifty-year mark and by 2020, this figure is set to reach 85% (Heinz Center, 2002; American Rivers, 2005a).

Between 1977 and 1982 the ACOE inspected 8,800 non-federal, privately owned dams across the U.S. which it classified as either "significant hazard – where a dam failure would risk property damage or "high-hazard" – where a failure could cause

significant loss of life (McCully, 1996; Heinz Center, 2002). Roughly one-third of these were considered "unsafe", primarily due to inadequate spillway capacities. A follow-up survey in 1994 indicated that at least 1,800 non-federal dams remained unsafe. The situation is similar for federally owned dams; a 1987 ACOE report classified 554 of its own dams and one-fifth of the Bureau of Reclamation's (BOR) dams as unsafe (McCully, 1996). And according to the most recent estimate, Corps' engineers have concluded that 13,000 dams in its National Inventory pose significant hazards, while 10,700 are high hazard risks (Heinz Center, 2002).

Increasingly, both dam safety and security (especially post-9/11) concerns have become major considerations in the politics of dam removal.[11] In part, these concerns prompted Congress to create the National Dam Safety Program (NDSP), as part of the 1996 Water Resources Development Act.[12] The NDSP was established under the jurisdiction of the Federal Emergency Management Agency (FEMA) – now part of the Emergency Preparedness and Response Directorate – with the purpose of reducing the "risks to life and property from dam failure in the US through the establishment and maintenance of an effective national dam safety program to bring together the expertise and resources of the federal and nonfederal communities in achieving national dam safety hazard reduction" (Heinz Center 2002, 64). And while the NDSP does not specifically govern or regulate dam removal, it remains relevant in addressing a variety of actions that modify dams.

Economics, Operations, and FERC Licenses

Related to safety concerns are economic issues, since it often proves cheaper to remove an aging dam than to invest in the necessary maintenance, repairs, and

environmental controls. Similarly, construction of many of the larger diversion and storage structures, especially in the American West, was heavily subsidized with federal funds and today, enormous government subsidies are required to offset the costs of dealing with a host of environmental and socioeconomic ramifications.[13]

Another driving source behind dam removal is the fact that many older dams no longer function as originally intended and have become functionally obsolete. The reservoirs of some have filled with sediment, while the functions of others have been replaced by alternative facilities. Even when an older dam remains functional, the benefits it provides may be less than the cost of meeting new environmental mandates. Such economic obsolescence is increasingly common for owners of many hydropower dams that were constructed prior to most environmental laws passed during the 1960s and 70s (Heinz Center, 2002). For many, their continued operation may be rendered uneconomic when investments are made to comply with the many current legal mandates to assure fish passage, provide downstream flows for healthy fisheries, protect water quality, and/or to reduce impacts on newly-listed species.

A related factor that may prompt dam removal relates to the regulation and permitting of hydroelectric dams by FERC. Although FERC has historically been reluctant to order the decommissioning of a dam, the agency has recently shown some willingness to choose the environment over hydropower. In fact, FERC's hydropower licensing process has resulted in the removal (either actual or scheduled) of no less than twenty dams since 1995 for environmental reasons.[14] In three of these instances, FERC's order to remove was issued against the wishes of both the dams' owners and the hydropower industry.

In large part, this change stems from a 1986 amendment to FERC's operating law, the Federal Power Act (FPA). In addition to a river's potential for power generation, FERC is now required to take a comprehensive approach when deciding whether to issue a license (or a renewal thereof) and give equal consideration to the following; energy conservation, protection of fish and wildlife, protection of recreational opportunities, and preservation of overall environmental quality. Known as the Electric Consumers Protection Act (ECPA), this was the first significant amendment to the hydro licensing provisions of the FPA since 1935 and represents a substantial increase in FERC's enforcement powers (Muchow and Mogel, 1996).[15] And according to Kerwin (1990), passage of the ECPA represented the culmination of the environmental community's legislative efforts for that decade.

As licenses for marginal dams are renewed by FERC under the amended FPA, it is likely that environmental controls will be required where few or none had previously existed. Presumably, this will render the continued operation for even more dams uneconomic. Those owned by small, undercapitalized companies or private citizens might be unable to make such transitions successfully, and the most viable option may be to surrender the operating licenses.

In addition, since the amended FPA obligates FERC to equally consider the power and non-power values of a project, the Commission acceded soon after the EPCA's passage that when it could not develop license conditions to meet its public interest obligation, even with ample use of its conditioning power, it had the authority to deny the relicense application and order a dam to be decommissioned and removed. This authority was made official in December 1994 when FERC released an official policy

statement on dam decommissioning and removal. Notwithstanding, former FERC Commissioner C. Hebert, Jr. released a passionate dissenting opinion against the Commission's decommissioning policy, indicating that it was "illegal and ill-advised" (American Rivers, 1999). Further, Hebert continues to advocate that the Commission vacate its 1997 order to remove the Edwards Dam on Maine's Kennebec River.

Public Opinion

"The [dam removal] movement is on its way. It's no longer dependent on the policies of federal agencies. It's rooted in communities all over the country" – (Babbitt, 1998 as quoted in Grossman 2002, 8).

Dam opposition and removal campaigns exist in many parts of the world, with some targeting extremely large dams such as India's Narmada Dam, Thailand's Pak Mun Dam, and Brazil's Tucurui' Dam (McCully, 1996; WCD, 2000). Currently the US – with an estimated minimum of 100,000 dams – has perhaps the most visible and active dam removal movement (IRN, 2001).[16] This ability (and perhaps luxury) of Americans to even contemplate the removal of a functioning dam that provides tangible benefits to society is indicative of the nation's contemporary status and quality of life; one that has not been enjoyed or readily available in the past. Gertsch (1986) accurately captures this sentiment in the following passage.

"...the quality of most of our lives today permits us the admirable luxury of being able to worry about such things as clean air and water, minimum stream flows, fish and wildlife habitat, and economic diversification. Our past conflicts were with nature, the elements, and imposing engineering obstacles; today our contests are with other interest groups each clamoring for its share of an increasingly scarce natural-resource base."

According to the World Commission on Dams (WCD), dam building in the US reached its peak in the late-1960s, and since 1998, the rates of dam decommissioning and removal have surpassed the rate of construction (2000).[17] This profound shift in public

policy over such a relatively short time span is truly remarkable. Today, mainstream environmental groups such as the Sierra Club and Trout Unlimited routinely endorse the removal of many large-scale dams across the nation. In addition, grassroots groups around the country have launched campaigns to dismantle dams in their communities, and hundreds of small, non-licensed private dams have already been removed.

Increasingly, this burgeoning public interest in dam removal has been captured by mainstream media outlets and conveyed in popular periodicals. For example, reporting on river restoration on dam-obstructed rivers in regional newspapers across the West has steadily expanded and national magazines have covered an array of related cases.[18] Initial attention was spurred by news and media coverage of groundbreaking dam removal ceremonies and rallies, especially when attended by high-profile political leaders (and policy entrepreneurs) such as former-Interior Secretary Bruce Babbitt and Oregon governor John Kitzhaber. The public's perception on costs and benefits of dams has continued to change, as increasing numbers of the nation's rivers are restored through dam removal.

Indeed, such widespread scrutiny over the perceived permanence of dams and the advancement of dam removal initiatives further into the mainstream of American politics and society will necessarily entail a comprehensive process and fundamental challenge to the status quo; the modus operandi of traditional development practices and management regimes will be confronted. Nonetheless, there is clear evidence of national momentum in the direction of river restoration through policy changes involving dam removal. For example, a minimum of 465 dams have been removed from the nation's waterways since the 1900s, and hundreds more are either committed for removal or under active

consideration for removal (American Rivers, 2005a). And since the precedent-setting removal of Edwards Dam first captured national attention in 1999, more than 185 dams have been removed. In 2005 alone, fifty-six dams in eleven states were either removed or slated for removal, in 2005 legislation was also introduced in both the US House and Senate that would permit The Secretary of the Army to execute small dam removal or rehabilitation projects deemed to enhance public safety or improve the quality of the environment, or is in the public interest. (American Rivers, 2005b; LOC, 2006a). [19]

III. The Importance of the Policy Change Literature to Dam Removal

An assortment of approaches have been developed and used to examine the phenomenon of policy change, which may ensue subsequent to such larger societal changes and shifting public perceptions. Scholars such as Kingdon (1995) and Rochefort and Cobb (1994) have focused on agenda setting and how political dynamics in the pre-decision process can affect subsequent policy change outcomes. Beyond the pre-decision process, Baumgartner and Jones (1993) offer a punctuated-equilibrium framework for understanding policy change that characterizes policymaking in the US as involving long periods of incremental change that are punctuated by brief periods of major change. Sabatier and Jenkins-Smith (1999) focus on the interaction of coalitions of actors with shared sets of policy beliefs and assess how policy change is both a function of competition within a given subsystem and events outside the subsystem. Each of these perspectives, as well as others, offers insights and basic parameters for inquiry into the realm of policy change.

This phenomenon of policy change is generally conceived as the replacement of one or more existing policies by one or more other policies – either via adoption of new

ones or the modification or repeal of existing ones – and is common discussed as relating to or including the phenomenon of policy termination (e.g., Lester and Stewart, 2000). However, this does not imply that the termination and change will necessarily evoke the policy outputs or outcomes. Rather, this distinction is made to highlight how these two expressions of policy transformation have had differential impacts across the main jurisdictional contexts in which the politics of dam removal transpire. At the federal level, these political dynamics unfold in both the context of executive agencies such as the ACOE and BOR, and an independent regulatory agency such as FERC. This research assumes that such potential for differential agency responses will lead to variation in the outputs of policy change across the different administrative jurisdictions.

The Context of Federal Dams

For the ACOE and BOR, discussions over river restoration and dam removal are largely situated in a political landscape defined by policy termination whereas for FERC, the politics of dam removal transpire in a context that is more prototypical of policy change in general. Specifically, this policy change transpired in 1986; it became manifest with passage of the ECPA and subsequent changes to FERC's operating law. Less than a year after its 1994 policy statement on decommissioning, FERC set precedent during a relicensing hearing with its landmark draft EIS-recommendation for removal of the Newport No. 11 Dam on Vermont's Clyde River (AFS, 2005).[20] This represented the first time FERC recommended removal as a preferred alternative against the wishes of a dam owner (e.g., a substantive output of fundamental policy change) (American Rivers et al., 1999).[21] In the context of ACOE and BOR dams, such a fundamental example of policy change cannot be identified. As a result, the contemporary politics of dam

removal transpire in a context defined by the termination of policy involving construction of large-scale, federally-subsidized dams and reservoirs.

Policy Termination

The overarching goal of agencies such as the ACOE and later, the BOR, has historically been to promote dams in order to achieve a host of interrelated goals; these have involved navigation, flood control, water diversion and storage, and hydropower generation. Oftentimes the related engineering and construction activities were undertaken at the expense of ecological concerns and full consideration of environmental impacts. A result of the modern environmental movement has been to shift the perceived logic and utility of dams among epistemic communities, the general public, political decisionmakers. Yet the policy of constructing large, publicly subsidized dams to provide societal benefits has not so much *changed* in the traditional sense; it has come to an *end*. Hence the policy option of constructing this type of federal dams and related structures to promote economic development and utilitarian goals has largely been terminated.

According to Brewer and de Leon (1983), termination in the public sector involves "the deliberate conclusion or cessation of specific government functions, programs, policies, or organizations" (26). Lester and Stewart (2000) add that the concept of termination became the focus of study in the mid-1970s, when scholarship converged on the process as a means of ending outworn or deficient policies or programs. Nonetheless, termination remains an uncertain aspect of the policy cycle; idea- or mission-based agencies and the programs and polices they implement often assume a life of their own and are sustained by well-established congressional support, constituent

bases, and an overall inertial resistance to change (Selznick, 1949; Freeman, 1965; Ferejohn, 1974).

And while it is often said that the termination of government programs is an exceedingly rare occurrence (e.g., Kraft, 2004), policy change via termination does occur and for this dissertation is evidenced through the fact that no, new large-scale federal dams have been authorized by Congress since the Colorado River Basin Project Act of 1968.[22] In addition, to this day many previously authorized projects are mired in controversy and/or remain in unfinished, inoperable states. This has led many to conclude that the heyday of large-scale federal dam building has passed; federal agencies such as the ACOE and BOR have been forced to shift functions and policy priorities, once rooted in civil works and resource development, to the maintenance of existing structures, resource management and environmental restoration (e.g., Feldman, 1991; Bates et al., 1993; McCully, 1996; Clarke and McCool, 1996;).

As de Leon (1983) would suggest, the termination of this government program was prompted in large part by the steady increase in political and ideological opposition to the policies of the federal dam-building era, not because the problems of flooding and water demand had been eliminated. Similarly, this policy shift has not occurred because of a single or sudden authoritative decision. Rather, this decades-long process resembles what Bardach (1976) called the "long whimper approach" to termination, whereby a combination of long-term decline in resources by which a policy is sustained and changing political values and ideology affect a moderately paced phasing-out of a policy or program.

The Context of Intergovernmental Relations and Dam Removal

The contemporary politics of river restoration for dams owned and/or regulated by state or local administrative agencies transpire in jurisdictional contexts that are defined by dimensions of policy change and termination – as well as policy diffusion. Traditionally in the American West, little attention was given to dam safety (and later environmental issues); structures were often built in sparsely populated areas in order to provide storage and diversion for ranching and mining activities and later, hydropower and urban and industrial uses. And while an increasing number of dams were built during the early-twentieth century, a series of catastrophic failures occurred and public concern mounted (Kollgaard and Chadwick, 1988). This elevated dam safety to a prominent position in state politics and prompted many states to reverse their historic lack of oversight; increasingly state legislatures authorized safety programs and established regulatory agencies. This was particularly true in western states where burgeoning population centers demanded construction of new dams, oftentimes in close proximity to cities and towns. For example, the failure of the 205-foot-high St. Francis Dam in Los Angeles Country, CA in March 1928 prompted the state legislature to place dams within its borders under official government regulation (Kollgaard and Chadwick, 1988).

Today, every state but Alabama has a dam safety regulatory program and state governments have regulatory responsibility for ninety-five-percent of the approximately 79,000 dams within the NID (ASDSO, 2006). And while these state programs vary in authority, their activities typically include safety evaluations, review of dam construction and major repairs, periodic site inspections, and approval of emergency action plans

(ASDSO, 2006). Nonetheless, it was not until a string of significant dam failures in the 1970s and the Federal Dam Safety Act of 1972 that the majority of state governments began to officially regulated dams within their borders (ASDSO, 2006).[23]

Dam Safety Environmental Concerns and Removal: Diffusion of Policy Change?

The concept of policy diffusion refers to the spread of a central policy ideology or principle to different levels and locations of government.[24] Central to this phenomenon is the transmission of a particular policy tool or alternative and its gradual acceptance across political regions and ultimately, within the hindmost parts of bureaucracies (Rogers, 1983). Moreover, as certain levels or branches of government "experiment" with policy alternatives, those which prove to be successful at producing desired outcomes may diffuse to other levels and locations of government. And while there exist multiple diffusion models, Berry and Berry (1999) argue that all variations hypothesize that states emulate each other for one of three reasons or via three communication channels; 1) states may learn from one another by borrowing policy innovations perceived as successful elsewhere; 2) states may compete with each other to conform with nationally or regionally accepted standards; or 3) elected state officials may react to pressure from citizens to adopt policies initiated in other states.

From all these perspectives, the steady increase in the number of dams removed for safety and environmental concerns across the country in recent decades characterizes this general notion of policy diffusion. In addition, the gradual acceptance and continued application of this policy option across levels of government and regions of the country further defines this phenomenon. And a brief chronological assessment of the diffusion of this policy change suggests that the decision to remove dams for environmental

reasons is transmitting west and in increasing magnitude from precedent-setting cases in eastern states such as Vermont, Maine, Wisconsin, and Pennsylvania, to western states including California, Oregon, Washington, Montana, and Arizona – where larger, more complex dams have recently been removed. However, it remains to be seen whether this policy change has or will become diffused across all levels of government and within the three primary regulatory jurisdictions related to dam ownership and regulation at the federal level. Nonetheless, according to Wright (1978), "... the extent to which national, state, and local jurisdictions are interconnected by dollar flows means that policy changes or actions at one level are likely to have important consequences at other levels" (Wright, 1978, p. 102).

IV. Jurisdictional Responses to Dam Removals and Funding Sources

Beyond the regulatory power over the thousands of nonfederal hydroelectric dams held by FERC, there exists no single federal agency responsible for all the nation's dams. In addition, despite the technical experience and construction prowess held by the ACOE and BOR, no governmental agency is charged with the comprehensive tracking and recording of dam decommissionings and removals (Grossman, 2002). Furthermore, there is no dedicated funding source at the federal level to remove dams for ecological or recreational concerns; nor is there a dedicated source for repair or removal of unsafe dams at the federal level.

Nevertheless, there are a host of federal programs and funding mechanisms that may be tapped for both removal and associated costs; in fact, a few dam removals have been funded directly through one federal source, while many others have resulted through intergovernmental combinations from many sources (American Rivers, 2000a).[25]

Altogether, more than 460 dams of various sizes and under differing jurisdictions have been removed across the US over the past forty-five-odd years (American Rivers et al., 1999).[26]

Army Corps of Engineers

The contemporary ACOE represents the world's largest public engineering, design, and construction management agency; it has a workforce of roughly 34,600 civilians and 650 military personnel (US ACOE, 2002). The agency is guided by the (current) stated mission to "work hand in hand [with military and civilian engineers, scientists and other specialists] as leaders in engineering and environmental matters" (US ACOE, 2002). As such, the modern Corps employs a diverse workforce of biologists, engineers, geologists, hydrologists, natural resource managers, and other professionals to pursue its mission and to "meet the demands of changing times and requirements" (US ACOE, 2002).[27]

Organizationally, the ACOE operates under the direction of the US Secretary of the Army, who is the senior official at the Department of the Army and reports directly to the US Department of Defense. The ACOE itself is directed by a Chief of Engineers who heads the Executive Office at the Pentagon. Currently, this office is held by Lieutenant General C.A.. Strock, who also serves as the Corps' Commander and is responsible for defining policy and guidance, and planning the direction for the organizations within the Corps (US ACOE, 2002).[28]

A capacity to respond effectively to changing policy priorities and willingness to adopt new procedures have been identified as defining features of the ACOE (e.g., Clarke and McCool, 1996; Mazmanian and Nienaber, 1979; Feldman, 1991; Wichelman, 1976;

Andrews, 1976). According to Clarke and McCool (1996), the agency has rarely turned down an opportunity to expand its mission and areas of responsibility, even when such expansions may have directly challenged its original development and construction-oriented mission. Such an organizational trait is perhaps most apparent in the Corps' response to the mainstream environmental movement of the 1960 and 70s and in particular, to the National Environmental Policy Act (NEPA) and the environmental impact statement (EIS) requirement.

The impact of NEPA on the operations of the federal bureaucracy was undeniable, yet the changes this prompted in behaviors and activities across the public sector (along with other policies of the "environmental decade") were far from equal. Rather, bureaucratic responses varied, with some organizations reacting more proactively and affirmatively than others (Clarke and McCool, 1996). More than thirty years of research has consistently identified the ACOE as the bureaucratic player (either alone or together with the US Forest Service (USFS)) that responded most promptly and completely to the drastic shift in policy direction (Lowry, 2003; Clarke and McCool, 1996; Taylor, 1984; Mazmanian and Nienaber, 1979; Wichelman, 1976; Andrews, 1976). This recognition of environmental quality as a contemporary objective for planning and funding requests was evident shortly after the passage of NEPA. For example, testimony in 1971 by the Corps' Director of Civil Works included the following.

"It wasn't until the passage of NEPA that we really had in our hands the authority to spend money, time, and effort in this field [environmental protection] over and above what were the precedent-setting studies in which economic development and the benefit-cost ratio were the be-all-and-end-all."[29]

Roughly thirty-years later in 2002, then-head of the Corps Lt. General R. Flowers, announced a new framework; the so-called "US ACOE Environmental Operating

Principles" which were deemed applicable to all of the Corps' decisionmaking and programmatic activity. These were said to "foster unity of purpose on environmental issues, reflect a new tone and direction for dialogue on environmental matters, and ensure that employees consider conservation, environmental preservation, and restoration in all Corps activities" (US ACOE, 2003). And according to the Ecosystem Management and Restoration Research Program within the ACOE, "environmental protection is a key component of the Corps' Civil Works Planning process" (US ACOE, 2003a).

According to Lowry (2003), there exist at least three main reasons why ACOE behavior has likely changed to thoroughly incorporate environmental considerations. First, for more than fifty years the Corps has been required to justify its projects via cost-benefit analyses. Second, the operations and decisionmaking processes of the Corps are now far more open and participatory as a result of the environmental decade (1960s-1970s). And third, as Clarke and McCool (1996) and others have documented, the ACOE has consistently been opportunistic in pursuing new mandates; ecological concern has for the most part been no exception.

In the Pacific Northwest, integration of such an ethos into the project management processes of the Corps is evidenced by fact that five of its major dams have been officially listed as "under consideration for removal", and one as "under consideration for spillway crest drawdown" (a structural modification) in order to promote the recovery of endangered Chinook and Sockeye salmon and Steelhead trout (US ACOE, 2004).[30]

The Corps in an Intergovernmental Context

Nationwide, where the ACOE has been formally involved with dam removal investigations in at least forty-nine instances, twenty-one dams have been removed, eight

are officially slated for removal, and fourteen remain under consideration for removal (US ACOE, 2004). In the intergovernmental context of state- or locally-owned/regulated dams, ACOE has been involved in the politics of river restoration through dam removal in at least eight of the twenty-one removals completed by 2004. The Corps has also been involved in at least one of the eight cases in which a nonfederal dam has been officially slated for removal, and in six of the fourteen cases where nonfederal structures remain under consideration for removal (US ACOE, 2004).

In addition, the Corps is currently active in a host of precedent-setting undertakings of river restoration in the American West, whereby dam removal has emerged as the leading policy option. Current examples include dams directly under ACOE jurisdiction (e.g., Elk Creek Dam in Oregon, discussed in Chapter 6); dams under the direct jurisdiction of other federal agencies such as FERC (e.g., Hells Canyon Dams in Idaho, Cowlitz Hydropower project in Washington); and dams owned by and under primary state or local jurisdiction that are situated in the intergovernmental context (e.g., Goldsborough Dam in Washington, York Creek and Alameda Creek Dams in California).[31]

A noteworthy example of ACOE involvement in the intergovernmental context began in 2001, when the Corps became active in investigating river restoration via dam removal in the Ventura River watershed through its leadership in the Matilija Dam Ecosystem Restoration Project (MDERP). In conjunction with the Ventura (CA) County Watershed Protection District, ACOE has led this multi-stakeholder effort to remove the 190-foot high Matilija Dam. The structure has facilitated beach erosion along Ventura County's Pacific Coast and functionally blocked a federally-listed (endangered)

population of Pacific steelhead trout from roughly fifty-percent of ancestral spawning and rearing habitat since 1947 (American Rivers, 2000).[32] The Corps' involvement in the MDERP to restore this "Southern California Evolutionarily Significant Unit" of steelhead represents one of the largest dam removal studies in the country, and one of the largest ecosystem restoration studies ever undertaken west of the Mississippi by the Corps (MDERP, 2004).[33]

The entire MDERP is currently estimated to cost $128.6 million. Of this, the federal contribution is scheduled to total $80.1 million; the remaining $48.5 million is to be covered by VCWPD.[34] Completion is scheduled for mid-2012; in the meantime, ACOE has a host of predetermined milestones that are typical for all of its federal civil works projects. The first began in January 2005, when ACOE initiated its general detailed design report (DDR) and is scheduled to end in September 2007. Also in mid-2006, the Corps began to prepare DDRs for specific aspects of the project (e.g., bridgework; levee construction; high-flow bypass channels; a de-silting basin; and, of course, dam and sediment removal). For its part, VCWPD is scheduled to initiate preparation of DDRs in early-2007 for related aspects of the project, including bridgeworks and a de-silting basin. The Corps is chiefly responsible for the actual dam and sediment removal operations; the design and planning phases for these are set to end in September 2008, with construction beginning in early 2009 (MDERP, 2005).

During the final engineering and construction phases, the Environmental Resources Branch (ERB) of the Corps will be responsible for coordinating and completing supplemental NEPA documentation (e.g., Environmental Assessments) in order to ensure that project changes resulting in impacts not covered in the Final EIS

(December 2004) are addressed.[35] In addition, NEPA documentation is required to be in compliance with all applicable laws and regulations including, but not limited to, the Clean Air Act, Clean Water Act, the National Historic Preservation Act, and the Endangered Species Act of 1973. ERB is also obligated to coordinate with VCWPD to ensure that supplements or addenda of the 1970 California Environmental Quality Act (CEQA) are completed with the environmental assessments (MDERP, 2005).[36]

Bureau of Reclamation

The Bureau has been called the "organizational expression of America's westward movement" (Clarke and McCool 1986, 92). Indeed, the BOR played an instrumental role in the development of the American West, as its projects have provided subsidized water for irrigation and industrial and urban development. Beginning in the 1940s and continuing into the early 1960s, the agency was able to effectively capitalize on the power-generating aspects of its irrigation projects as unprecedented projects such as Hoover and Glen Canyon Dams were constructed. Many scholars have described this as the golden-era of the BOR in the American West, when the agency boldly demonstrated its engineering and technical prowess on bodies of water throughout the region (Reisner, 1993; Wilkinson, 1992; Worster, 1985; Clarke and McCool, 1985).

However the agency began to show signs of organizational decline in the late 1950s, as "good" dam sites and potentially rich farmland became increasingly scarce and competition with the Corps over remaining projects became common (Clarke and McCool, 1985). The combination of the modern environmental movement, subsequent legislation during the 1960s and 70s, and an increase in fiscally conservative politicians further compromised the Bureau's claim to hegemony over water development in the

American West. Added to these obstacles was the simple fact that (arguably) their original missions to reclaim the arid West via irrigation-oriented water projects had, for the most part, been completed.

Due to such conditions, and the inherent mission and traditional ethos of the agency, BOR has become a conspicuous target for environmentalists and in particular, the dam removal movement. The EIS requirement has also caused problems for the Bureau and has led to considerable difficulties in meeting the extensive requirements for environmental review and for the planning of ecologically sensitive and nonstructural alternatives. Unlike the Corps, personnel within the Bureau were initially skeptical and resentful of NEPA-mandated procedures and were less successful in augmenting their traditional mission with more environmentally oriented activities (Clarke and McCool, 1985).

In fact, it was not until 1984 that BOR published an official handbook to assist its employees who, in their daily work, are required to comply with NEPA and various other environmental laws (US BOR, 2000). Moreover, the Bureau actually recognized its historical reluctance to adequately address environmental concerns in its official handbook[37]. In the end, it remains unclear whether bona fide attempts of BOR to shift its focus from project construction to newer forms of water management and/or to transform itself from a civil works agency into a water distribution and resource management agency will fully materialize. Thus it remains unclear whether the agency can "reinvent" itself in light of the changes that have occurred in the larger sociopolitical environment.

The BOR in an Intergovernmental Context

Despite its historical reluctance to wholly endorse the policy option of dam removal, the Bureau has recently become involved in river restoration studies where the removal of structures is the primary focus. Current examples include dams directly under BOR jurisdiction (e.g., Savage Rapids Dam in Oregon, discussed in Chapter 6); dams under the direct jurisdiction of other federal agencies such as FERC (e.g., Fossil Creek Dam in Arizona, the five-dam Battle Creek Restoration Project in California); and dams owned by and under primary state or local jurisdiction that are in the intergovernmental context (e.g.,. the Upper and Lower Stokes Fish Passage Improvement Plan in Washington, the Mountain Snake Province Fish Habitat Improvement Measures in Idaho).

Perhaps the most significant example of BOR's involvement in the intergovernmental context emerged in 1995 when the Bureau was contracted by the California Department of Parks and Recreation (CA DPR) to prepare an appraisal report on options to remove Rindge Dam, located roughly thirty-five miles northwest of downtown Los Angeles. Standing at 102-feet and spawning 140-feet, the structure has fully blocked Malibu Creek since 1924; the creek has long-since been recognized as the extreme southernmost range and spawning ground of the same imperiled population of Pacific steelhead that is of concern farther north on Matilija Creek and the Ventura River. The Corps supplanted the Bureau in 1998 when it began a reconnaissance study to determine the federal interest in the restoration of Malibu Creek. And while this current study is roughly seventy-five-percent complete, it will be without federal funding for the fiscal year 2007 (IRN, 2006).

Another noteworthy example of the Bureau's involvement in the intergovernmental context of dam removal began in 1998 the Ventura County Board of Supervisors resolved to remove Matilija Dam. Under the leadership of the BOR, the initial multi-stakeholder effort was launched in the spring of 1999 to assess the viability of dam removal and ecosystem restoration. The BOR investigations culminated with the publication of an appraisal study to remove Matilija Dam. In October 2000, then-Secretary of Interior Bruce Babbitt participated in a BOR-led demonstration project at Matilija dam in which the effectiveness of various concrete removal techniques was evaluated. This was attended by more than 250 individuals and as a classical focusing event, Babbitt's appearance – whereby he stood atop the dam with sledgehammer in hand – helped propel the MDERP into the national spotlight and generated an outpouring of public interest. In 2001, the Bureau was replaced by the Corps, and thus began ACOE's aforementioned partnership with VCWPD.

Another example of the Bureau's involvement in the intergovernmental context of dam removal stems from 2000 when, through its Upper Colorado Endangered Fish Recovery Program, proposed removing the Price Stubbs Dam on the Colorado River, roughly 20 miles upstream from Grand Junction, CO. Removal of the dam, owned by Palisade and Mesa County Irrigation Districts, would restore passage and designated critical habitat for the Colorado pikeminnow and the razorback sucker, both of which are federally listed as endangered. In addition to BOR, several local communities support dam removal in order to develop whitewater recreation and one of the dam's two owners has expressed support for removal, while the other has concerns over a reserved water right that would be affected with removal (American Rivers, 2006e).

A private developer has a license to generate hydropower at the dam site, but he has been unable to move forward because of endangered species concerns. The most likely alternative to removal (e.g., construction of fish passage devices) is estimated to cost at least $500,000 more than dam removal; structural modifications would also present a less certain chance for success to recover the endangered fish species (American Rivers, 2006e).

A final example of the Bureau's intergovernmental involvement in the politics of river restoration in the American West involves the scheduled removal of the Elwha and Glines Canyon Dams on Washington's Olympic Peninsula. In this case, the Bureau will actually engage in dam removal activities. After Congress passed the Elwha River Ecosystems and Fisheries Restoration Act (P.L. 102-495,) in 1992, which directed the Secretary of the Interior (via the BOR) to study ways to fully restore the Elwha River ecosystem, the federal government purchased the FERC-regulated dams and related facilities in early-2000 from private owner, the Fort James Corp., for $29.5 million.[38] And since eighty-three percent of the river, and one of the dams, are located within the borders of Olympic National Park, the Bureau will continue to operate the dams with National Park Service oversight until removal begins in 2009. The Bureau will lead removal and sediment transport operations at the two dams which are scheduled for completion in 2011, at an estimated cost of $182 million.[39] It is interesting to note that removal of the 210-foot-tall Glines Canyon Dam will represent the largest undertaking of its kind in history (American Rivers, 2006a).

Federal Energy Regulatory Commission

Unlike the Corps and Bureau, FERC is an independent regulatory agency within the Department of Energy. At the broadest level, it monitors the nation's energy markets through regulation of the interstate transmission of electricity, natural gas, and oil. Regarding FERC's regulatory function for hydroelectric power, its jurisdiction extends to virtually all non-federal hydropower dams in the US. This includes all dams which meet at least one of the following criteria: occupies federal public land or federal reservation(s); located on a navigable stream, or a non-navigable stream which affects interstate or foreign commerce (including providing power to an interstate power grid); uses surplus water or water power from a federal dam; and/or was constructed after August 26th, 1935 (HRC, 2005).

The five-member Commission is responsible for issuing twenty-five- to fifty-year operating licenses to more than 1,800 non-federal hydroelectric dams across the nation. This number of FERC licenses represents roughly ninety-six percent of the privately and publicly (non-federal) owned projects; in all this accounts for roughly fifty-six percent of the nation's total hydroelectric generating capacity (FERC, 2005a). States with the greatest number of FERC-regulated hydroelectric projects are Washington, California, and Oregon.[40] In addition, more than 500 licenses have expired since 1989, while many operate with temporary extensions (Cantrell, 1997). In the next fifteen-odd years, licenses for an additional 550 dams are due for renewal and 250 will require action by 2010 (American Rivers, 2000).

In the context of environmental protection, FERC licenses now stipulate minimum requirements for water flow and release levels; required means of fish passage;

and in some cases, management regimes for watershed lands are expressed (NHA, 2006). Yet since many FERC-dams were originally licensed prior to the advent of modern environmental laws, the relicensing process is an important vehicle for environmental review and at times, restoration of rivers and ecosystems across the country.[41] According to FERC's own analysis, the last ten years of relicensing have brought more than 250 dams into compliance with modern environmental laws and standards, while reducing the nation's total energy generation by less than .01% (League of Conservation Voters, 2002). The FERC relicensing process has also prompted the actual removal of dozens of environmentally-harmful dams across the country, including Maine's Edwards Dam in 1999. Edwards set precedent as the first large dam with existing hydroelectric facilities to have its renewal application refused by FERC on the grounds that the power it produced fell short of justifying the ecological harm it caused.

Since this, FERC has removed at least eight dams and declined to relicense no less than ten dams across the nation for environmental reasons.[42] In addition, FERC took the unprecedented step in 2004 of rejecting preliminary permit applications for two new hydroelectric dams on Idaho's Snake River; environmental values at the sites were found to be more important than power production.[43] Regarding the current dismantling of the FERC-regulated Milltown Project on Montana's Clark Fork River, FERC Chairman Pat Wood III commented the following.

"I will always be a strong supporter of building and maintaining infrastructure to support our energy needs, especially clean hydropower. In this instance, however, the environmental requirements trump power production".[44]

FERC in an Intergovernmental Context

To a greater degree than both the Corps and Bureau, the FERC regulatory context is inherently intergovernmental since *all* of the roughly 1,700 hydropower dams it licenses are non-federally owned.[45] Nonfederal owners typically include public utilities, private companies, municipalities, and states. While FERC has the exclusive authority to license virtually all of the nation's hydroelectric dams owned by such nonfederal actors, it is subject to a vast intergovernmental system of checks and balances administered by other agencies and their statutory missions at both the federal and state levels. And currently, the majority of FERC hydropower-related activities relate to the relicensing of existing projects (FERC, 2005). At the federal level, regulatory and resource agencies that may be involved in a relicensing, depending on the nature and geographic location of the project and the resources affected, include the Environmental Protection Agency; US Fish & Wildlife Service; National Marine Fisheries Service; US Geological Survey; US Forest Service; Bureau of Land Management; National Park Service; Bureau of Indian Affairs; Army Corps of Engineers; and Bureau of Reclamation.

In addition, FERC relicensing procedures must involve state and local resource management agencies. For example, under section 401(a) of the Clean Water Act, states must issue a certification that a license will comply with all applicable water quality standards; FERC may not issue a license if a state denies such certification. States also administer property rights, both in land and waters occupied by hydropower projects. Through their public utilities commissions, states also regulate the rates for any retail service of electricity generated by FERC-licensed projects. Through their departments of fish and game or wildlife, state may also recommend conditions, for the protection,

mitigation, and enhancement of fish and wildlife resources and recreation.[46] And finally, states must also assure protection of coastal waters affected by a hydroelectric project, in compliance with the Coastal Zone Management Act (HRC, 2006).

Since the precedent-setting cases on the Clyde (VT) and Kennebec (ME) Rivers in the mid-to-late-1990s, where FERC-regulated dams were removed for environmental reasons despite their owners' opposition, a number of other instances of river restoration involving dam removal have occurred. Many of these have involved significant degrees of intergovernmental involvement. A prime example relates to the 2003 agreement to decommission and remove the American Fork Project in Utah. In this case, the project's main dam was constructed in 1907, when official land designations such as National Forests, Parks, and Wilderness Areas were not in use. During the ensuing decades, a host of federal land classification and management policies were enacted and as a result, the hydro project came to extend from inside the Uinta National Forest and include portions of the Lone Peak Wilderness the Timpanogos Cave National Monument.

In February of 2003 PacifiCorp – the project's owner, the US Forest Service, National Park Service, US Fish and Wildlife Service, Utah Division of Wildlife Resources, Utah Department of Transportation, Utah State Historic Preservation Office and conservation groups Trout Unlimited and American Whitewater signed a settlement agreement to decommission the dam in September 2006 and have it removed by the end of 2007. The restoration effort involves removal of the dam and other barriers that prevent the migration of the Bonneville Cutthroat Trout. Removal of the hydroelectric facility will provide additional protection for the national monument – which the

project's water diversion pipeline had bisected, and provide a more pristine environment in the federally-designated wilderness area (HRC, 2006a).

Another case of dam removal and river restoration with significant intergovernmental dimensions involves the FERC-regulated Bull Run hydroelectric project in northwestern Oregon. In May 2004, FERC approved an application from the Portland General Electric Company (PGE) to surrender its license for the 22-megawatt project; the surrender application also included decommissioning the project and the proposed removal of its two dams (Little Sandy and Marmot) (American Rivers, 2004).[47] The restoration area includes lands administered by several entities, including PGE – eighty-four-percent; US BLM – nine-percent; State of Oregon – four-percent; and US Forest Service – three-percent located in the Mt. Hood National Forest (FERC, 2006). In addition to these entities, signatories to the settlement agreement included NOAA Fishers (formerly National Marine Fisheries Service), Oregon Department of Environmental Quality, Oregon Division of State Lands, Oregon Department of Fish and Wildlife, Oregon Department of Water Resources – all of which are involved with fish and water quality monitoring; the City of Sandy, Oregon; and a host of conservation groups. The full restoration project is scheduled for completion by the end of 2008, after which several populations of federally-listed (threatened) Coho salmon, Steelhead trout (threatened), and sea-run Cutthroat trout will regain access to more than twenty-two miles of historical spawning and rearing habitat (American Rivers, 2004).

Conclusion

This chapter was driven by an ambitious goal, to set the stage for proceeding chapters where the primary jurisdictional contexts in which the politics of river

restoration and dam removal transpire are first described, and then analyzed empirically through detailed case studies. In order to prepare this stage, the chapter opened with a broad historical overview of water development and the damming of rivers in the American context. The socioeconomic benefits and socio-ecological costs of this development were considered and the primary factors behind the genesis of the dam removal and river restoration movement were discussed.

With the structure of the stage in place, a general discussion on the dynamics of policy change was offered and a brief consideration of precedent-setting cases provided context to allow for more detailed examination into the new era in river management and restoration where the policy of dam removal has become a viable option. This was followed with examination of the differential jurisdictional responses to the dynamics of policy change in general, and dam removal specifically. This would have been incomplete without a consideration of the intergovernmental context and the extent of involvement on behalf of federal entities in the politics of dam removal at the state and local levels.

With the stage set, the next chapter presents the empirical framework through which policy change and the political dynamics of river restoration and dam removal are examined across administrative jurisdictions.

Notes

[1] Statement from Bruce Babbitt's address to the Ecological Society of America, August 4, 1998, Baltimore.

[2] Including smaller dams that do not fit this description, the total number of dams is over 100,000 (ASDSO, 2006a). Of the dams listed in the ACOE's NID, 58% are privately-owned; 17% are locally-owned; 15% are undetermined; 5% are owned by state governments; 3% are federally-owned; and 2% are owned by public utilities (American Rivers, 2005a). Federal ownership rises to roughly 5% when including the Departments of Agriculture, Defense, Energy, Labor, and State (International Boundary and Water Commission), the Nuclear Regulatory Commission and the Tennessee Valley Authority (ASDSO, 2006a)

[3] Statement from Bruce Babbitt's address to the Ecological Society of America, August 4, 1998, Baltimore.

[4] On Idaho's Clearwater River, river restoration has included the removal of the 76 foot-high Grangeville Dam in 1963 and the 45-foot high Lewiston Dam in 1972. Restoration has improved the lot of migrating salmon and steelhead and restored nearly 25 miles of free-flowing river. At the time then-ID governor Cecil Andrus commented, "For me, the explosion that helped bring down the dam is a large one, for it symbolized that the main stem of the Clearwater River will always be free of dams" (Cantrell, 1997).

[5] The origins of the contemporary dam removal movement relate in some degree to the actions of an unlikely political actor. In 1987, President Reagan's second Secretary of the Interior, Donald Hodel, proposed an extensive study to restore California's Hetch Hetchy Valley via removal of the O'Shaughnessy Dam on the Tuolumne River. The proposal was ultimately defeated with Congressional refusal to fund the study. In addition, then-San Francisco Mayor Diane Feinstein ardently opposed the prospect of removing the dam, calling the proposal "... crazy, the height of folly, and the worst idea . . . since the sale of weapons to the Ayatollah" (Pope, 1987) In addition, Feinstein referred to the water delivered to San Francisco by the O'Shaughnessy Project as the city's "birthright" (Pope, 1987). While a clear divergence from his previous policies, which commonly favored development of the nation's natural resources over their preservation, Hodel's interest in developing the prospect of dam removal was motivated by a general desire to enhance the visitor experience within Yosemite National Park (Pope, 1987). To compensate for reductions in the City of San Francisco's water storage capacity and annual profits from hydroelectricity sales, Hodel proposed the expanded use of the already-existing Don Pedro Reservoir downstream on the Tuolumne River and outside the boundaries of the national park (Pope, 1987; International Rivers Network, 2001). In addition, a variety of ulterior motives have been suggested to explain Secretary Hodel's support for dam removal and restoration of Hetch Hetchy Valley. Pope (1987) cites the following. First, early press reports speculated that Hodel was actually promoting the restoration of Hetch Hetchy as a way to build support for construction of the long-delayed and controversial Auburn Dam on the American River in the Sierra foothills. A likely basis for such speculation comes from a memorandum to Interior Department officials in which Hodel suggested that if San Francisco were to require a new water source after the removal of O'Shaughnessy Dam, Auburn would be a clear choice. Second, Hodel may have sought to distance himself from his compulsively anti-conservation predecessor at Interior, James Watt. Indeed, Hodel was previously Watt's right-hand man at the Department and long-time to supporter of Watt's policies. Due to such an association, Hodel may likely have had no desire to experience a political fate similar to his predecessor's, as Watt was drummed out of office by a tide of public indignation in 1983. Third, and as a more charitable explanation, Hetch Hetchy would be a likely location if Secretary Hodel were ever going to take a strongly pro-conservation stance. After all, his plan was nominally designed to promote the interests of national parks as recreation resources -- and the utilitarian concept of "parks for people" may have influenced his reasoning. And while the dam still stands, it remains at the forefront of actions endorsed by proponents of dam removal. For example see the Sierra Club's Hetch Hetchy Restoration Task Force at http://www.sierraclub.org/ca/hetchhetchy/

[6] Traditional hydropower from dams, where water is trapped at a high level and released, provides roughly seven percent of the nation's electricity. However, increasing concerns over damaging river environments and harming migrating fish have both hindered development of new hydropower facilities and bolstered the dam removal movement. Currently, projects designed around "hydro-kinetic" or "in-stream" technology are being tested in an effort meet increasing energy demands with renewable, relatively "green" sources. This works by submerging turbines into the natural path of moving water, such as a river, canal or deep ocean current. Supporters of this technology maintain this development will have far fewer negative environmental impacts when compared to hydropower dams since the turbines utilize widely-spaced, blunt rotor blades which rotate, at a slow 32 rpm. The intent is to facilitate the ability of migratory aquatic species to travel around (and perhaps through) the projects' turbines (Ho, 2006).

[7] Diadromous fish species migrate between both salt and fresh waters.

[8] For example, Schmidt, et al., (1998) documented how nonnative trout introduced below Glen Canyon Dam are actively facilitating the extinction of endangered native fish species through outcompetition and predation.

[9] Fish populations include Chum, Coho, Sockeye, and Chinook salmon; and Steelhead trout in WA, OR, ID, and CA.

[10] Two-Mile Dam on the Santa Fe River in New Mexico was demolished in 1994, due to a crack found a year earlier located in the wall of the eighty-five foot-high earthen water supply dam. Shortly thereafter, a new and larger fault line was discovered near the dam's base. Despite strong public opposition to removal, the state engineer ordered an emergency removal, which revealed serious structural problems caused by leakage through the previously discovered cracks. Costs for the dam removal (including site restoration) totaled $3.2 million, and were covered by the local water supply company (Cantrell, 1997).

[11] Since the 1980s, the loss of life from dam failures has declined significantly (Heinz Center, 2002). Prior to this however, dam failures in the US have caused a significant number of causalities. For example, the 1889 collapse of the South Fork Dam upstream from Johnston, PA killed 2,209; the collapse of southern California's Saint Francis Dam in 1928 killed 525; and during the 1970s, four dams (e.g., Buffalo Creek, WV; Can Lake, SD; Teton, ID; and Kelly Barnes, GA) killed a combined 300 and were primarily responsible for initiating contemporary dam safety efforts (Heinz Center, 2002).

[12] Public demand for assurances of dam safety at the state level dates coincides with the initial construction of most structures and safety-related concerns have progressively increased over time. In particular, concerns have come in response to a succession of catastrophic dam failures across the country. In large part, public concern was galvanized with the 1889 failure of the South Fork Dam, located fourteen miles upstream from Johnstown, Pennsylvania. The resulting flood has been identified as the first major disaster relief effort handled by the newly established American Red Cross (ASDSO, 2006). Other notable dam failures occurred in 1972 at Buffalo Creek (West Virginia); in 1976 on the Teton River (Idaho); in 1977 at Laurel Run (Pennsylvania): and in 1977 at Toccoa Falls (Georgia) (ASDSO, 2006c).

In reaction to these and other dam failures (e.g., St. Francis – 1928 and Baldwin Hills – 1963, both in California), federal agencies sought to improve their dam safety programs. Notable examples included passage of the National Dam Inspection Program (PL92-367) in 1972, and the creation of the Interagency Committee for Dam Safety (ICODS). Nonetheless, improvements in federal dam safety only brought into clearer focus the deficiencies of a vast number of non-federal dams; such dams were the primary responsibility of the states (ASDSI, 2006c).

Fundamentally, each state in the US has primary responsibility for the security of nonfederal dams under its jurisdiction. California has the largest regulatory program for this general purpose; in fact California laws on dam safety date to 1929 and have gone on to provide the basis for the 1970 "Model Law for State Supervision of Safety of Dams and Reservoirs" (e.g., USCOLD) (Kollgaard and Chadwick, 1988). Since then, the USCOLD has been adopted generally by most other states in the US.

In the early 1970's a national dam inventory was established (under the authority of PL92-367) and it identified nearly 90,000 non-federal dams; in 1978-81 (under authority of the same law) about 9,000 of these non-federal dams were inspected in a "Phase I study" and roughly one-third were found to be "unsafe" (ASDSO, 2006c). And since the federal government has no direct responsibility or authority for the safety of non-federal dams, the results of the Phase I study dramatically highlighted the need for adequate state programs (ASDSO, 2006c).

In the early 1980's the Federal Emergency Management Agency (FEMA) funded a study on the safety of non-federal dams. A follow-up 1982 report highlighted the need for better state dam safety programs, interstate dam safety communication, and the need for a nationwide assessment of state programs. Another FEMA study in 1983 reported that over half the states either had no dam safety law or no dam safety program.

In 1987, a group of twelve states formed the Model Dam Safety Program Advisory Committee. Led by representatives from California and Ohio, the Committee was organized by the Association of State Dam Safety Officials (ASDSO); their purpose was to create a guide for state officials who were either initiating

or improving upon state programs (FEMA, 1998). In addition, by outlining key components of an effective dam safety program, the Committee was created to address a void in effective and sustainable state programs. To date, the Committee's goal remains the ultimate elimination of unnecessary risks created by questionable non-federal dams (FEMA, 1998).

An additional step towards increasing dam safety was taken in October 1996 when Congress passed The National Dam Safety Program Act, as part of the Water Resources Development Act of 1996 (PL 104-303) (ASDSO, 2006).12 It was established to improve safety and security around the nation's dams via four general mechanisms; these included provision of assistance grants to state dam safety agencies to assist them in improving regulatory programs; the funding of research to enhance technical expertise as dams were built and rehabilitated; establishment of training programs for dam safety inspectors; and creation of a National Inventory of Dams (ASDSO, 2006). In 2004, the authorized funding level for this Act was $8.6 million. This broke down in the Act as follows: 1) $6 million for state dam safety program assistance grants; 2) $1.5 million for dam safety research; 3) $500,000 for technical training for state dam safety inspectors; and, 4) $600,000 for FEMA's administrative costs (ASDS), 2006). In addition, the Act called for FEMA (now part of the Emergency Preparedness and Response Directorate) to provide education to the public, dam owners, and other entities about the need for strong dam safety programs – nationally and locally – and to coordinate partnerships among all actors within the dam safety community to enhance safety. At the federal level, the several agencies with some responsibility for dam safety (e.g., ACOE, BOR, Tennessee Valley Authority, and FERC) coordinate their activities through the ICODS (Kollgaard and Chadwick, 1988). This Committee was created to encourage the establishment and maintenance of effective federal and state programs to ensure dam safety. Yet at the state level, there exists no such comprehensive, interstate working group. Rather, each state is responsible for the security of dams under its jurisdiction and when the total number of these is combined, the result is that state governments have substantial regulatory responsibility for 95% of the approximately 79,000 dams listed in the NID.

[13] See Reisner (1993) for detailed discussion on the federal subsidization of water development and irrigated agriculture in the American West. Federal money fully subsidizes the navigation waterway on the Lower Snake River in eastern Washington. An estimated $35 million a year goes to barging and shipping subsidies, and a 1998 report by the Congressional Budget Office states that barging on the Snake receives the highest percentage of subsidy of any freight transportation in the United States (Taxpayers for Common Sense 2000). A 1998 General Accounting Office report stated that $3 billion has been spent since 1968 on failing fish recovery programs in the Pacific Northwest. A similar estimate is that the $194.5 million spent annually on restoration could be avoided with dam breaching and including other factors; a net economic benefit of $86.7 million would result (Lowry 2003). For additional information on the economic inefficiencies of large, federal dams, see Ferejohn (1974); Anderson (1983); and Wahl (1989).

In addition, there are potential tribal compensations if particular salmon populations, guaranteed by treaty, cannot be recovered. Current estimates list tribal compensations in the tens of billions of dollars, and breaching supporters routinely circulate figures that are paid by the federal government to tribes for treaty violations. Examples include a $53 million settlement and $15 million annually paid to the Colville tribes due to Grand Coulee Dam in WA, and a $39 million settlement to the Nez Perce tribe for two dams in MT.

[14] As of February 7, 2006 dam removal as the primary method of river restoration emerged from the FERC licensing process for the following projects: Newport #11 Dam was removed in 1996 (VT); Grist Mill Dam was removed in 1998 (NH); Edwards Dam was removed in 1999 (ME); Columbia Fall Hydro Dam was fully removed in 1998 (ME); environmental conditions placed by FERC on a relicense application for the Cushman Hydroelectric Project rendered it uneconomic in 1998 (WA); the Mokelumne Project was removed in 2000 (CA); the Smelt Hill Dam was removed in 2002 (ME); Condit Dam was ordered for removal in 2002 (WA); Woods Creek Dam was removed in 2002 (WI); Rock Creek Dam was removed in 2002 (OR); East and West Panther Creek dams were removed in 2002 as part of a larger FERC-negotiated settlement (CA); agreement was reached to remove Bull Run Hydro Dam in 2002 (OR); Sturgeon River Dam was removed in 2003 (MI); agreement was reached to remove the Powerdale Hydro Dam in 2003 (OR); agreement was reached in 2003 to remove the American Fork Project in (UT); Marquette City Dam #1 was ordered for removal by FERC in 2004 (MI); the Elwha River and Glines Canyon Dams were

ordered for removal in 2004 (WA); the Irving/Childs Hydropower Dam was ordered for removal in 2005 (AZ); and an agreement was finalized to remove Milltown Dam in 2005 (MT).

[15] Prior to the announcement, FERC had no policy specific to dam removal, as the FPA is silent on the issue – with the implicit assumption that continued operation of dams is in the public interest. And because regulatory prescriptions used in license proceedings for small, privately-owned dams typically emerge from state environmental agencies – a third of which have no statutes regarding dam removal, FERC's 1994 statement remains somewhat of an exception (Doyle et al., 2003).

[16] The International Rivers Network (IRN), based in Berkeley, CA, publishes a monthly electronic "River Revival Bulletin" Subscription is free and can be requested at: www.irn.org It lists dam removal initiatives internationally and updates the progress. In terms of numbers of large dams (those greater than 5 meters in height), the US (6,575 dams) ranks second to China (22,000 dams) (WCD, 2000).

[17] The WCD was an independent, international, multi-stakeholder process which addressed the controversial issues associated with large dams. The Commission completed its work with the launch of its final report in November 2000 and disbanded.

[18] For examples, see the electronic archives of news outlets such as *High Country News; The Los Angeles Times; San Francisco Chronicle; The Sacramento News; Boston Globe* and *The Missoulian*. In addition, popular periodicals include *Time Magazine; CQ Weekly Report*; *Bioscience*; *Popular Mechanics; E Magazine;* and *Fly Rod and Reel.*

[19] Dam removal and restoration for 2005 was planned in: AK, CA, CT, DC, IL, ME, MD, MI, NH, NJ, NY, OH, PA, VA, and WI.

[20] Spring flooding during 1994 had partially breached the nineteen-foot high and ninety-foot-long dam and since its license had previously expired, its owners were seeking a relicense prior to rebuilding the hydropower facility. With a removal recommendation from the Vermont Department of Fish and Wildlife, FERC ruled against reconstruction and the dam was completely removed in 1996 in order to meet state objectives for restoring fish habitat.

[21] The Fort Edward hydropower plant on New York's Hudson River was removed in 1973 by the Federal Power Commission (FPC) – prior to it being renamed FERC in 1977. The FPC conducted one of its first EISs on the proposed removal of Fort Edward Dam and pursuant to this review; it approved the removal in 1973. This early case of dam removal is significant for a number of reasons. Most significantly, pursuant to hearings conducted by the FPC, the dam owner, the Commission, and state and local officials were found not to have exercised due diligence in planning for and completing the dam removal. Significant water quality problems were also created by PCB-contaminated sediments released from behind the dam. In 1976, New York State closed the Hudson River for fishing, decimating a $40 million striped bass fishery. In 1977 and 1978, approximately 180,000 cubic yards of contaminated sediments were removed from the river by the state. And in 1983 the EPA declared a significant stretch of the river a federal Superfund site due to the PCB contamination. EPA and New York State Department of Environmental Control continue to evaluate options for addressing this extensive PCB contamination. Full remediation has yet to be completed (American Rivers, 2006b).

[22] Environmentalists and others often lobby government to take the action of policy termination for natural resources policies that have outlived their original purposes and/or that resulted in unacceptable environmental degradation (Kraft, 2005). Contemporary examples of this in the western US include many land and water use policies that are defended by politically powerful constituent bases that benefit from their continuation (see Roodman, 1997; Myers and Kent, 2001)

[23] Four dams (e.g., Buffalo Creek, WV; Can Lake, SD; Teton, ID; and Kelly Barnes, GA) killed a combined 300 and largely initiated contemporary dam safety efforts (Heinz Center, 2002).

[24] Rogers (1983) defines diffusion as "the process by which an innovation is communicated through certain channels over time among members of a social system" (5).

[25] Federal funding for dam removal can come from a variety of sources; these include: existing federal funding programs; general budgets of federal agencies; federal Congressional appropriations specific to a particular dam; natural resource damage assessments and other mitigation funds; decommissioning funds and other mitigation under the FERC licensing process; and in-kind federal assistance in the form of studies, technical assistance, and direct assistance by branches of the Armed Services (e.g., demolition training exercises) (American Rivers, 2000a).

[26] Most of the dams removed to date have been owned privately, by local government, or by public utilities (American Rivers, 2005a).

[27] The mission of the ACOE further states that it is to "provide quality, responsive engineering services to the nation including: planning, designing, building, and operating water resources and other civil works projects (Navigation, Flood Control, Environmental Protection, Disaster Response, etc.); designing and managing the construction of military facilities for the Army and Air Force (Military Construction); providing design and construction management support for other Defense and federal agencies (Interagency and International Services)." (US ACOE, 2002).

[28] Lt. Gen. Strock holds a BS in civil engineering from the Virginia Military Institute and an MS in civil engineering from Mississippi State University. He is a Registered Professional Engineer.

[29] Testimony of Major General F. P. Koisch, Hearings on Stream Channelization Before the House Committee on Government Operations, 92nd Congress, 1st Session, Part 2, at 556, 580 (1971).

[30] The dams under consideration for removal are the four Lower Snake River dams in Idaho and Elk Creek Dam in Oregon. John Day Dam on the Columbia River is under consideration for structural modifications to its spillway.

[31] For ACOE involvement in the FERC-regulated Hells Canyon Dam, see ACOE (2002a) and for the Cowlitz River see TPU (2005); for its involvement in the intergovernmental context, see WDFW, 2000; ACOE, 2006a.

[32] Recent estimates suggest that approximately six million cubic yards of sediments (e.g., silts, sands, gravels, cobbles and boulders) have accumulated behind the dam; during high, storm flows, finer grain sediments are simply swept over the dam's crest. Furthermore, the remaining (shallow) reservoir stores roughly 500 acre-feet of water, a mere seven percent its original capacity. The remaining capacity is expected to disappear by 2020 and by approximately 2040, the entire reservoir basin is expected to have reached an equilibrium condition, whereby it is completely filled with sediments – estimated to total in excess of 9 million cubic yards MDERP, 2005). In fact, the removal and transport of this sediment is likely to be the greatest cost associated with removing the dam and restoring the river.

[33] In addition to steelhead, the dam's ecological effects have negative impacts on other sensitive aquatic species (e.g., fish, including the Arroyo chub – a California State "Species of Special Concern"; the southwestern pond turtle; and amphibians, including the arroyo toad and the California red-legged frog). Removal of the dam would restore access to approximately 17.3 river miles of high quality, critical habitat to these and other species (MDERP, 2005).

[34] As the nonfederal sponsor of the project, VCWPD is obligated to provide thirty-five-percent of the total project costs allocated to ecosystem restoration and fifty-percent of the total project costs allocated to recreation (MDERP, 2005). Together, these percentages of the two primary project components account for VCWPD's $48.5 million contribution, as stipulated in its contract with the ACOE.

[35] The Corps' ERB estimates that five additional Environmental Assessments (EAs) will be needed over the course of the engineering and construction phase (MDERP, 2005).

[36] CEQA applies to certain activities of state and local public agencies. A public agency must comply with CEQA when it undertakes an activity defined by CEQA as a "project." A project is an activity undertaken by a public agency or a private activity which must receive some discretionary approval (meaning that the agency has the authority to deny the requested permit or approval) from a government agency which may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment.

Most proposals for physical development in California are subject to the provisions of CEQA, as are many governmental decisions which do not immediately result in physical development (such as adoption of a general or community plan). Every development project which requires a discretionary governmental approval will require at least some environmental review pursuant to CEQA, unless an exemption applies (State of California, 2005).

[37] Regarding the BOR's environmental commitments after a project has been completed; the agency's official handbook states the following. "As part of any environmental compliance activity, some environmental commitments are invariably made. These may be requirements out of an ESA consultation process; agreement to implement recommendations of a FWCA report; or simply the environmental commitments of a NEPA document which are written statements of intent, made by Reclamation, to mitigate or lessen environmental consequences associated with project activities. Environmental commitments can also address activities that restore or enhance environmental quality. These commitments are made in most environmental compliance documents (e.g., EAs, biological assessments, and EISs). Presently, no consistent effort is being made to ensure that these commitments are actually met, nor is there a consistent effort to monitor the effectiveness of commitments that are actually implemented to ensure that they meet stated goals of mitigation and/or enhancement. Environmental commitments should be viewed as a part of the action and as important as any other part. The final positions/recommendations on a project are based on the assumption that commitments will be met. If they are not, then reviewing/regulatory agencies would be justified in revisiting approvals granted to completed projects on the premise that the project was not implemented as described. Also, as new projects/activities are proposed, these review/regulatory entities can view past performance as an indication of future performance. Legitimate proposals for new activities can be jeopardized by past failures to honor commitments. NEPA documents, besides just listing environmental commitments, should include a process/program to identify specifically how the commitments will be met. Postdecisional monitoring is required by 40 CFR 1505.2(c), which states (in part): "A monitoring and enforcement program shall be adopted and summarized where applicable for any mitigation." Reclamation has historically been inconsistent in applying this requirement."

The agency's NEPA Handbook states the following regarding the need to become more proactive in its natural resource recovery efforts. "Resource recovery efforts are those activities that will mitigate current or past impacts to resources caused by Reclamation construction, O&M, or other programs, or that will mitigate effects or simply benefit the environment. Reclamation has tended to react only to clear requirements of NEPA, ESA, the National Historic Preservation Act, and other laws, permits, or regulations when initiating resource recovery efforts, whether they were mitigation or enhancement. At times, this reactive mode of resource recovery has been less than enthusiastic. With the changing mission of Reclamation toward active resource management, resource recovery should be approached in a more proactive way. This view is supported by NEPA's basic policy statement, which directs Federal agencies to promote the well-being of the environment. In addition, other laws (e.g., ESA) direct Federal agencies to utilize existing authorities to further the purposes of environmental laws. Reclamation should identify natural resources recovery activities associated with a proposed action (or in the action area) and may include them, as appropriate, as part of a Reclamation action. This type of recovery action is in concert with the mission statement of Reclamation and is fully supported by the language of NEPA."

[38] In 1994, The Department of Interior's Elwha Report concluded that dam removal was the best alternative for river restoration.

[39] In addition to the $182 million, the federal government will fund $70 million to mitigate the imminent changes of unprecedented scale that will follow removal of the Elwha dams. This includes construction of a new water-treatment plant for the town of Port Angeles, WA, and a new sewer system, a raised flood-protection levee, and a fish hatchery for the Lower Elwha Klallam Reservation, located at the mouth of the river (American Rivers, 2006a).

[40] FERC does not regulate any dams in the following states; DE, MS, ND, SD, and HI (FERC, 2005).

[41] On April 30, 2002, Arizona Public Service Company (APS) filed an application with FERC to surrender the license for its Childs Irving Hydroelectric Project, located on Fossil Creek in central Arizona. APS proposed to remove the dam and most of the project works in conjunction with the license surrender. FERC approved surrender application in October 2004, and thus dismissed an earlier-filed application for a new license for the project. FERC Commissioners stated the following in the order, "Our action is in the public interest because surrender of the license and removal of the project works will have environmental benefits that can be achieved without a significant reduction of generation available to the public.

[42] Newport #11 Dam was removed in 1996 (VT); Grist Mill Dam was removed in 1998 (NH); Columbia Fall Hydro Dam was fully removed in 1998 (ME); the Mokelumne Project was removed in 2000 (CA); the Smelt Hill Dam was removed in 2002 (ME); Creek Dam was removed in 2002 (OR); East and West Panther Creek dams were removed in 2002 as part of a larger FERC-negotiated settlement (CA); and Sturgeon River Dam was removed in 2003 (MI). Environmental conditions placed by FERC on a relicense application for the Cushman Hydroelectric Project rendered it uneconomic in 1998 (WA); Condit Dam was ordered for removal in 2002 (WA); agreement reached to remove Bull Run Hydro Dam in 2002 (OR); agreement reached to remove the Powerdale Hydro Dam in 2003 (OR); agreement reached in 2003 to remove the American Fork Project in (UT); Marquette City Dam #1 was ordered for removal by FERC in 2004 (MI); the Elwha River and Glines Canyon Dams (FERC-regulated dams until 1992) were ordered for removal in 2004 (WA); the Irving/Childs Hydropower Dam was ordered for removal in 2005 (AZ); and agreement finalized to remove Milltown Dam in 2005 (MT).

[43] Prior to this decision, FERC's policy allowed objection of preliminary permits only when there was a "permanent legal barrier" to license issuance (e.g., hydroelectric dams are legally barred from National Park lands). In its April 2002 decision, FERC stated that "preservation of the natural scenic beauty, wildlife habitat, and last undeveloped waterfall on this stretch of the Snake River Canyon in its historic condition is a far more valuable use of the resource than the proposed development of the sites' potential for generating hydroelectric power" (HRC, 2004).

[44] FERC Press Release, 1/19/05.

[45] The only FERC-regulated hydropower dam in the US is the Pelton Round Butte project on central Oregon's Deschutes River. It is owned and operated by Portland General Electric and one-third owned by the Confederated Tribes of the Warm Springs Reservation (HRC, 2006a).

[46] FPA sections 10(a) or (j) (see Sections 2.3.4(B) and (C)

[47] PGE states that it wishes to surrender the Bull Run Project license because it has determined that the likely cost of environmental protection, mitigation, and enhancement measures associated with relicensing the project would make continued operation uneconomical. PGE and the other settlement parties have agreed that removal of the project works will serve the public interest by restoring the Sandy and Little Sandy Rivers to a free-flowing state, thereby improving fish passage conditions for various species of salmon and trout, several of which are listed as threatened under the ESA (FERC, 2006).

CHAPTER 3

I. The Larger Context of Policy Change

Introduction

It has long been recognized by those who study public policy in the American political context that there exists "a striking diversity of approaches developed and used by scholars...which raises questions concerning the meaning of the policymaking process" (Schlager 1999, 223). Within this area of study, there exists a similar assortment of approaches that have been developed and used to examine the phenomenon of policy change. And in general, existing research has identified a selection of major factors which underlie policy change (agenda setting, e.g., Kingdon, 1995; systemic perturbations, e.g., Sabatier, 1988; venue changes, e.g., Baumgartner and Jones, 1993; policy learning, e.g., Heclo, 1974; Sabatier and Jenkins Smith, 1993; focusing events, e.g., Birkland, 1997; and issue or conflict expansion, e.g., Schattschneider, 1960; Stone, 1997).

Agenda Setting

Scholars such as Cobb and Elder (1972) and Kingdon (1995) have focused on agenda setting and how political dynamics in the pre-decision process can affect subsequent policy change outcomes. In this context, the dependent variables are primarily agenda setting and the specification of policy alternatives. And while the scope of inquiry is largely confined to the initial stages of the policy process, the utility of such an approach in assessing the policy dynamics of dam removal has been demonstrated (Clark, 2004).

The bulk of Kingdon's (1995) work focused on two broad policy areas, health care and transportation. His approach represents a multiple streams framework, as the policy process is viewed as being composed of three streams of actors and process. The problem stream consists of problem recognition and definition. The policy stream is comprised of ideas and the proponents of policy solutions to problems. The political stream consists of political events (i.e., elections) and the overall national mood behind such events. These three process streams are largely independent of one another yet at some critical junctures, the three are joined and the greatest policy changes grown out of this coupling of problems, policy proposals, and politics. When these streams converge in a window of opportunity (i.e., an opportunity to push a pet proposal or conception of a problem), the possibility of policy change increases yet is not guaranteed. Kingdon suggests that solutions often "search" for problems and both solutions and problems have equal status as separate streams in the system, and the popularity of a given solution at a given point in time often affects the problems that come up for consideration. The coupling of solutions to problems is most likely when policy windows are open (which happens with either the appearance of a compelling problem or by happenings in the political stream). A final, yet highly significant element in the model is the role of policy entrepreneurs as brokers of political ideas. Not only are these actors responsible for prompting important people to pay attention to problems, but also for coupling solutions to problems and for coupling both problems and solutions to politics.

Punctuated Equilibrium

Beyond the two main aspects of the pre-decision process, Baumgartner and Jones (1993) offer a punctuated-equilibrium framework for policy change, which characterizes

policymaking in the US as involving long periods of incremental change that are punctuated by brief periods of major change. The framework stresses the importance of external sources of change and explains policy change as a function of the interaction between external changes in policy image and venue, which lead to the rapid creation, destruction, or change in policy subsystems. Major change occurs when proponents of change manage to create new policy images and exploit (new) multiple policy venues. Hence, policymaking is not always incremental as suggested by Lindblom's (1959) "science of muddling-through".

Advocacy Coalitions

The advocacy coalition framework (ACF) of Sabatier and Jenkins-Smith (1993; 1999) focuses on the interaction of advocacy coalitions of various actors that have shared sets of policy beliefs within a policy subsystem; policy change is a function of competition between coalitions within this given subsystem and events outside the subsystem. As a dynamic model, the ACF argues that over time, actors in coalitions, along with the support of policy entrepreneurs, seek to alter the behavior of government institutions such that their core beliefs are translated into policy objectives (Sabatier and Jenkins-Smith, 1993).

In Lowry's (2003) account of various efforts to restore rivers in the US, the ACF is used to examine the interaction between different coalitions of competing actors involved in the politics of river restoration. It is also used to assess the relative degrees of political receptivity to proposed changes. The other component of Lowry's (2003) analytical framework draws upon literature on efforts to protect common pool resources, primarily Ostrom (1990). This is used to examine the physical complexity of the policy

changes being attempted and serves to assess the degree of complexity related to implementing related decisions. Together, these two conceptual categories are said to define the political circumstances that determine the degree of river restoration. The specific elements this framework and the possible magnitudes of policy change they may produce are the subject of the next section.

II. Dam Politics and Policy Change: Lowry (2003)

The theoretical framework developed by Lowry (2003) represents a timely and foundational inquiry into a policy domain in flux. The purpose of its design was to examine and improve the ability of researchers to anticipate different types and magnitudes of policy change relative to the broader policy shift in contemporary river management and restoration. The dependent concept thus involves the type and extent of policy changes; these range from disjointed and minor to fundamental and dramatic.

Lowry maintains that political scientists have tended to pay more attention to broad policy changes or shifts, rather than variations within them. And while broad policy change has and will continue to occur, Lowry argues that these changes do not happen all at once or in the same way across different locations. Rather, during the current era in river management, he posits that certain political circumstances are likely to produce a variety of actual changes across a wide range in scope and magnitude. This dissertation accepts such a rational proposition, yet expects that political jurisdiction and related administrative context will largely determine or define the political circumstances identified by Lowry.

In the original work, Lowry analyzed individual cases of river restoration from across the nation. Specifically, eight individual case studies were examined; each

involved a wide range of restoration efforts in terms of river type and size; primary water uses and/or users; climate; environmental concerns; and endangered or threatened species. This dissertation proposes to add context to and focus more precisely on this somewhat amorphous focus of Lowry's (2003) work.

Additionally, in regards to administrative context, five cases examined by Lowry were under the primary jurisdiction of executive agencies at the federal level and the remaining three were under the jurisdiction of FERC.[1] By structuring analysis on specific jurisdictions at both the federal and state levels and focusing on the political dynamics unique to each context, this dissertation shall enhance and add context to the general findings of Lowry's (2003) work. Therefore in the current analysis, cases of policy change involving removal of individual dams in the American West are examined and compared on the basis of the four primary political jurisdictions and related administrative context.

The Framework

The theoretical framework of Lowry (2003) is based on a synthesis of literatures; elements of the framework were derived from broad concepts related to both the advocacy coalition framework (ACF) literature (e.g., Sabatier, 1988; Sabatier and Jenkins-Smith, 1993; 1999) and studies of common-pool-resources (CPR) (e.g., Ostrom, 1990). By synthesizing relevant concepts, Lowry's work extends the ACF literature by systematically comparing policy change in a number of cases within a policy subsystem. I seek to build on this by systematically comparing policy change in cases still within this larger policy subsystem, yet differentiated by unique political circumstances related to jurisdictional or administrative context. In addition, Lowry extends the CPR literature by

describing coalition efforts to restore, rather than merely manage and sustain, a common pool resource. Similarly, I seek to further extend this by comparing the interaction of coalitions across jurisdictional contexts, as the politics of policy change and river restoration transpire.

Advocacy Coalitions

The ACF literature was used by Lowry (2003) to capture the degree of receptivity on behalf of different coalitions as they attempt to affect specific policies in their favor. This was termed the "politics of the situation". Key factors related to policy change include whether the primary decisionmaking venue is tolerant of change; the type of interactions between coalitions – which may range from collaborative to conflictual; whether the costs of the status quo are high and readily apparent; and whether scientific information on potential benefits of change is widely embraced.

According to Sabatier and Jenkins-Smith (1993; 1999), policy change is a function of three sets of factors; these include competition among actors within a policy subsystem or community; changes and events outside the subsystem; and the effects of rather stable system parameters (e.g., general attributes of the problem area, fundamental social and cultural values, and basic constitutional structure and rules). Within a given policy subsystem, there are generally two main coalitions operating to affect policy in the direction of their favor. Each is defined by core aspects of its belief system.

According to Sabatier (1988), these belief systems involve sets of value priorities. Also, these are said to include the causal assumptions held by coalition members on how to realize these priorities and thus, belief systems are conceptualized in the same manner as public policies designed to address particular problems (Sabatier, 1988).[2] And

because the relative strength of competing coalitions within a subsystem typically remains rather stable over periods of a decade or more, Sabatier and Jenkins-Smith (1993; 1999) suggest that policy domains be examined over a period of at least a decade in order to appreciate the evolution of competition and change through time.

Major changes in the core belief systems unique to each coalition are said to primarily be the result of changes external to the subsystem. Of particular significance are widespread socioeconomic conditions and technology; elections and shifts in governing coalitions; policy decisions and impacts from other subsystems; and dramatic focusing events (Sabatier and Jenkins-Smith, 1993; 1999). And while major changes to core policy beliefs are most often the result of such external perturbations, changes in the secondary or auxiliary aspects of a belief system often occur due to policy-oriented learning by various coalitions or policy brokers. As a key ingredient for policy change, the phenomenon of policy learning is defined as, "relatively enduring alterations [to] behavioral intentions that result from [time and] experience and are concerned with the attainment or revision of public policy" (Sabatier and Jenkins-Smith 1993, 6).

Furthermore, policy-oriented learning across belief systems is said to be most likely when a particular set of conditions exist (Sabatier and Jenkins-Smith, 1999). The first requires the existence of an intermediate level of informed conflict between coalitions; this requires that each coalition has the technical resources to engage in such debate or conflict and that the conflict involves secondary aspects of one belief system and core elements of the other, or between important secondary aspects of each coalition's belief systems. The second set of conditions requires the existence of a forum with adequate prestige as to compel professionals from different coalitions to participate;

similarly, this forum should be dominated by professionals (Sabatier and Jenkins-Smith, 1999).

Common Pool Resources

The CPR literature is used by Lowry (2003) to capture the physical characteristics of the resource itself and describe related elements of physical complexity regarding attempted policy changes. By extending the CPR literature to examine policy change from a more traditional, political science-based perspective, Lowry (2003) examined specific variables in two distinct categories. The first relates to scale; this was measured in terms of the number of political jurisdictions involved and the number of these affected by proposed changes. The second category relates to dimensionality; this included the difficulties associated with undertakings involving more participants, differing perspectives, and a "torturous path of decision points" (Pressman and Wildasky 1984).[3] Taken together, these categories compose the second component of the framework; it is broadly termed the "Physical Complexity of Policy Changes".

Lowry posits that dimensions of physical complexity are crucial, since highly complex situations are often more challenging to change. And while this proposition seems logical enough, the methods used to operationalize this focus on the physical attributes of a resource require a closer examination and explanation.

At first glance, it seems logical to assume that the physical complexity of proposed policy changes would solely relate to the sizes of both a given dam and the river it obstructs.[4] However, recent empirical studies of CPR management have lent support to the general assertion common to the CPR literature that physical size is not a determinant of physical complexity; nor is the scope of the groups affected by changes to existing

institutional or management regimes (Agrawal, 2000; Tang, 1992). Lowry (2003) was the first to extend this conclusion (or exclusion of physical size and scale) to examine policy change involving river restoration and dam removal. It seems curious however that Lowry retained a portion of this conclusion (e.g., that scope of groups affected by change) and used it as part of the measure for the first component of his framework (e.g., "the politics of the situation").

In addition, traditional CPR literature has primarily focused on describing cooperative efforts among resource users (e.g., appropriators) to protect and sustain a given CPR (e.g., a forest, fishery, or irrigation system) through decentralized, local, and self-regulating collaborative management arrangements (e.g., Ostrom, 1990; 2001).[5] As such, Lowry's dependent concept of substantive policy change to promote river restoration is quite different; and this phenomenon of policy change is perhaps more dynamic than the localized, institutional arrangements studied by traditional CPR scholars.[6] Later in this dissertation, a review of cases involving policy change and dam removal indicates that the sheer physical size of proposed undertakings may be of more importance than suggested by the traditional body of CPR literature – and by extension Lowry (2003).

III. Typology of Policy Changes

Lowry's framework posits four possible outcomes of policy change when both the political receptivity and physical complexity related to proposed changes vary – from low to high. The method used for linking case studies to the four types of policy change was based upon the two main dimensions of the framework; these characterize both how decisions are made (e.g., the political interaction between coalitions) and how

complicated it is likely to be when implementing these (e.g.., the complexity of the proposed undertakings).

Fundamental policy changes are said to be likely outcomes when decisionmaking venues meet the following criteria, they are largely receptive to change; restoration projects involve few political jurisdictions and have a single dimension; costs of maintaining the status quo are high and readily apparent; and there exists broad scientific consensus on the predicted benefits of change. Such conditions are said to produce dramatic and permanent policy changes, including dam breaching or complete removal.

Because this is the principal type of policy change being debated in the three case studies examined in this dissertation, fundamental policy change is the primary focus. And, as will be discussed later in this dissertation, policy change involving dam removal has been initially or tentatively accepted as the option for river restoration by each of the primary administrative agencies in the four case studies – albeit to varying degrees. As such, the type of coalition interactions and political debates vary considerably across the three jurisdictional contexts. The extent to which fundamental policy change has diffused throughout each jurisdictional context also shows considerable variation.

Lowry's second type of policy change, termed "experimental", is said to be a likely outcome when political receptivity to change is high, yet so too is the complexity and number of jurisdictions. In such cases, Lowry suggests that policy learning occurs; participants monitor and assess how minor changes in one water project or restoration to one river segment affect the actions in others. Thus, major changes are possible, but only after time and much policy learning.

The third type, "secondary policy changes," are said to be likely outcomes when there is low political receptivity to change and rather low complexity associated with proposed changes. Minor policy changes are likely to result from reluctant compromise between coalitions, as opposed to genuine and lasting policy learning. It is likely, according to Lowry that such outcomes are due to the fact that conditions for political receptivity are not ripe for more dramatic change.

The final type, "disjointed policy changes" are the least dramatic and said to be likely outcomes when political receptivity is low and complexity is high. Lasting policy changes are therefore unlikely, and those which do occur are disconnected and temporary. Such outcomes stem from the overall lack of policy learning between polarized coalitions.

Based on this typology, Lowry's (2003) overarching conclusion suggests that when coalition interactions are receptive to change and proposed changes are relatively low in terms of complexity, fundamental policy changes (e.g., dam removal) are probable. Indeed, such a noncontroversial conclusion is highly plausible; the change or reversal of policy may *forever* be expected in less complex and controversial situations or contexts. Yet recent years have witnessed dramatic instances of policy change whereby the formal decision to remove existing dams has emerged in fairly complex and controversial situations. Such an unexpected production of dramatic and permanent policy changes in complex physical and political circumstances is thus of particular interest to this dissertation.

Unexpected – yet Dramatic Policy Change

In 2004, the decision was made to remove the Glines Canyon and Elwha River Dams from the Elwha River on Washington's Olympic peninsula. This decision materialized after more than twenty years of protracted conflict and legal maneuvering; it exemplifies an unexpected, yet dramatic instance of policy change. The restoration effort is scheduled to cost an estimated $182 million and be completed by 2008. It will entail the intentional removal of the largest dam in history; Glines Canyon Dam stands at 210-feet and the Elwha Dam stands at 108-feet. In addition, the decision to remove these dams required a series of inherently complex processes; these included the preparation of an EIS; legislative action and funds appropriation in the US Congress; and a transfer of dam ownership from private to public sectors – at a cost to the federal government of $29.5 million (HRC, 2006a). Additional dimensions of complexity stem from the location of one of the dams targeted for removal; it stands within the current boundaries of Olympic National Park; and removal of the two dams will increase the amount of silt in the river with release of some eighteen million cubic yards of dirt and gravel that have accumulated behind the dams for the last ninety-odd years.[7]

The mere fact that the policy option of dam removal has been chosen to restore rivers such as the Elwha – and an increasing number of others – seemingly defies the otherwise commonsensical and rational proposition offered by Lowry (2003); low political receptivity combined with high physical complexity will prevent dramatic policy changes from transpiring. Thus major policy change *can* occur, not only in the West, but also in cases when complexity is high and receptivity is low. It is the purpose of this

dissertation to search for an enhanced and more nuanced understanding regarding the political and jurisdictional dynamics of river restoration through dam removal.

IV. Hypotheses and Proposed Additions

The Politics of the Situation

In the original framework, Lowry discussed the political receptivity to policy changes as capturing the interaction between different coalitions involved in specific situations. Additional "important and observable conditions" were posited in regards to the interaction between different advocacy coalitions that enhance receptivity to change proposals. The first of these looked at whether the decisionmaking venue is tolerant of change; interactions between coalitions may range from collaborative to conflictual. Lowry maintains that variations exist between different venues in terms of their receptivity to change; this enables strategic behaviors on the part of change advocates (e.g., "socialization of conflict" – Schattschneider, 1960) and "venue shopping" by strategically minded political actors – Baumgartner and Jones, 1993). The hypothesis is that receptivity to change increases if decisionmaking occurs in venues that are tolerant of policy change proposals.

This dissertation's focus on jurisdiction adds to this; by design, cases are organized on the basis of the political or administrative venue predominantly involved with selecting policy change proposals. This anticipation that jurisdiction has an independent influence in determining the magnitude of policy change also promotes examination of the possible role of policy typology or "decision type" on the type of relationships and behaviors between coalition actors. This consideration is based on the work of Wilson (1980) regarding the distribution of costs and benefits and how this

relates to expected behaviors on behalf of coalition actors. The perceived distribution and magnitude of the costs and benefits associated with dam removal and/or substantial structural modifications are expected to be unique when organized on the basis of jurisdiction and related political context.

The second additional condition posited by Lowry looked at whether the costs of maintaining the status quo are high and readily apparent. The ACF holds that progress toward consensus on goals may occur when "all major coalitions view a continuation of the current situation as unacceptable". Also, CPR literature illustrates that collective action is more likely when the costs of maintaining current patterns of resource use are costly or ineffective. In other words, when the status quo is widely perceived as unacceptable, different coalitions that previously competed and obstructed each other's efforts can pursue significant changes to traditional behaviors. The hypothesis is that receptivity to proposals for change increases if the costs of maintaining the status quo are higher and more apparent.

The third observable condition posited by Lowry looked at whether scientific information on potential benefits stemming from changes is widely embraced. He maintains that cooperative relationships between different coalitions are more likely when they agree on scientific analyses of likely benefits stemming from their actions. Existing literature has documented the importance of reliable, consistent, scientific information in fostering efforts at collaborative decisionmaking, especially those involving environmental issues. The hypothesis is that receptivity to change the status quo increases if diverse interests share accurate and science-based information on future potential benefits regarding change proposals.

This dissertation expands on this by assessing the impact that the presence of a federally listed endangered or threatened species has on scientific consensus and recognition of the likely benefits associated with dramatic policy change. Is receptivity to change the status quo greater when endangered species are directly involved and prominent policy issues?

Characteristics of the Resource Itself

Lowry conceives of "Physical Complexity of Policy Changes" as capturing the physical characteristics of the resource itself. Again, Lowry put forth a host of "observable conditions with which to differentiate levels of complexity for individual situations" and discussed how these relate to policy change proposals. Two different conditions determine the levels of physical complexity of attempted changes to a resource. The first is scale, which is measured in terms of the general number of political jurisdictions involved and affected by proposed change. The hypothesis is that cases with a greater number and type of political jurisdictions are more complex and less likely to produce policy change than those with fewer. Specifically, Lowry discussed dimensionality as capturing the difficulties involved with undertakings that involve more participants, differing perspectives, and a "torturous path of decision points" (Pressman and Wildavsky 1984). Cases involving policy change are differentiated according to whether the undertaking is one-dimensional or multidimensional. The hypothesis is that multidimensional programmatic undertakings are generally more complex and less likely to produce policy change than one-dimensional ones.

This dissertation's focus on jurisdictional or political context will complement this aspect of Lowry's work. Specifically, cases involving restoration and dams in the

federal context are clearly more "complex" and "multidimensional". Moreover, as a venue, the US Congress is perhaps defined by the greatest degree of "torturous paths of decision points". And when a proposed dam removal would require Congressional action, the likelihood for dramatic policy change (e.g., removal) may be extremely slim, if not utterly out of the question. In the FERC context, Congress has already passed legislation amending the relicensing procedure to include provisions for removal. Hence, for cases under the jurisdiction of FERC, it is clearly more likely for more dramatic outcomes, involving a far less "torturous path". The 1986 amendment to FERC's relicensing process will provide the exact protocols and procedures within FERC when authorizing dam removal and assessment will be made on the relative "tortuousness". Similarly, the intergovernmental jurisdictional context of state and local agencies presumably involve less torturous paths and hence, more fundamental policy changes are expected and dams are more likely to be removed.

This dissertation's focus on jurisdictional contexts of river restoration and dam removal is intended to complement Lowry's discussion on jurisdictional dimensionality. Specifically, this research will examine the "type" of political jurisdiction involved, in terms of history, mission, guiding legislation, trajectory, and culture. The hypotheses related to these dimensions of jurisdictional type would follow those suggested by Clark and McCool (1996), Mazmanian and Nienaber (1979), and Espeland (1998).

In addition, the current research includes an augmented measure of the physical complexity of the proposed dam removal, in terms of the sheer size of the structure (length x width), as Lowry does when looking exclusively at dam removal. Specifically, I consider the size of the reservoir impoundment and the number of river miles to be

restored with dam removal. This adds to and complements the size measure as offered by Lowry.

Lowry's basic argument was that the type of policy change occurring in different river restoration cases across the country is largely inspired by the interaction of political receptivity to change and the physical complexity of proposed changes. Lowry concludes that when coalition interactions are receptive to change and proposed changes are relatively low in terms of complexity, fundamental changes are possible. Such a noncontroversial conclusion is probable, since the change or reversal of policy may forever be more likely in less complex and controversial situations or contexts.

This research is designed to address this shortcoming and specifically, to further examine this issue of "situation" or context and how it relates to the degree of policy change. This will be accomplished in two primary respects. First this research focuses exclusively on the political dynamics of the river restoration and dam removal debate unique to the western US. Lowry's research included case studies of river restoration from across the US. Such a broad selection of regionally disparate cases raises a number of questions. Lowry's analysis is structured around studies of dramatic instances of policy change on relatively small and less complex rivers in the East. It then proceeds west and to higher levels of complexity and drama. This raises the possibility that regional variation was an important cause that underlies Lowry's complexity variable. In this sense, rivers obstructed by small-scale dams in states such as Maine and North Carolina are generally less complex than those in the West, with the multiple purposes of water storage, hydropower, drinking water, flood control, navigation, and recreation; especially when such purposes are intimately linked to one-hundred-plus-foot-high

structures, impounding vast reservoirs. Add to this the generally arid climate of most of the western US (when compared to the predominant conditions in the East), and the dams on western rivers appear to embody the term "complexity". Why not remove this source of influence and focus solely on the arid western US, where "dam politics" are arguably an entirely different beast when compared to the more humid East?

Second, other than individual river cases and regional variation, Lowry applied his framework to a regionally-disparate set of cases from any variety of jurisdictions; there appears to be no consistent rationale behind their selection. Alternatively, this research specifically analyzes the political circumstances unique to the main jurisdictional context involved with particular cases of river management. As an underlying dimension, jurisdictional context is assumed to have some independent effect on the magnitude of policy change. Thus, this research extends Lowry's existing framework to examine variation within the policy shift regarding rivers based on individual river cases and their predominant jurisdictional context, as the unit of analysis. This dissertation takes a much closer look at the unique political or administrative jurisdictions that are the primary venues for specific cases of river restoration and dam removal.

V. Research Design

Methods

The conceptual framework developed by Lowry (2003) is rigorously applied, with the aforementioned additions, to each case study in Chapter 7. Similar to the methodological approach employed by Lowry, this research analyzes the three federal case studies in an in-depth fashion from a qualitative standpoint. Data collection was

largely comprised of personal interviews with individuals from the three jurisdictional contexts and with targeted members active in the respective advocacy coalitions. Legislative records, agency publications, and archival materials were also examined. Additionally, I traveled to each of the four case study locations in order to obtain a personal perspective and acquire idiographic sources of information from a variety of sources.

As a means to augment this qualitative analysis, a quantitative component is used to triangulate the findings and conclusion. This also allow for a comparison of the distribution of cases and magnitudes of policy change in the realm of river restoration from across a much larger sample size (N = 55). To assess this larger sample, an index of actions on dams was constructed; it ranges from 'no action' – to 'some structural modification' – to 'outright removal' and analysis is based on descriptive statistics and bivariate correlations. Specific independent variables are used to assess the variation in cases of policy change involving river restoration across this larger sample size. These include a mix of variables both used previously by Lowry (2003) (e.g., size of dam; degree of cooperation; age of dam; activity status; degree of hazardousness; cost – benefit ratio) and additions (e.g., size of reservoir impoundment; number of upstream river miles restored) (250-252) . These fifty-five cases and related quantitative analysis represent my best "read" on what factors have been important in dam removal decisions until this point in time (e.g., 2006). Detailed discussion on the measurement and operationalization of these independent variables and hypotheses is offered in the final chapter.

Case Studies

The selection of cases is based on the main federal jurisdictional context of each dam. One case study from each context is examined (e.g., ACOE, BOR, and FERC). As executive agencies, both ACOE and BOR were selected in order to further examine the variation between restoration projects and dams. Broad research questions include the following. Why are FERC-regulated dams increasingly being removed and why are such fundamental policy changes not happening with federal- and most state/locally-owned dams? Are there observable differences between the two main line agencies with respect to the politics of river restoration and dam removal? What role does institutional/jurisdictional context have on the promotion or suppression of issues on the political agenda? The following case studies in each jurisdictional context are examined in-depth in Chapter 7.

Federal Ownership and Operation

The US ACOE and US BOR represent the two executive agencies that have been primarily active in the construction of federal dams and related water projects. By engaging in a host of civil works-related projects, the ACOE and later the BOR – as well as their constituent bases – lobbied Congress for appropriations and when successful, proceeded to initiate construction activities for the nation's largest and most comprehensive water development projects. To examine the ACOE context, the policy change proposal to remove the Elk Creek Dam, located in the upper Rogue River watershed of southwestern Oregon, is examined. In this case, the Corps received Congressional authorization to build the structure in 1962 for flood protection, yet construction did not begin in earnest until 1987. Less than a year later, construction was

halted and currently, the structure remains roughly one-third completed. At a current height of eighty-three-feet, the dam provides no benefits and costs taxpayers roughly $300,000 per year for maintenance and biological operations to protect the federally-listed (threatened) Coho salmon. For its part, the ACOE has lobbied Congress for the funds necessary to remove Elk Creek Dam for more than a decade.

To examine the BOR context, the policy change proposal to remove the Savage Rapids Dam, located 120 miles upriver from the Pacific Ocean on southwestern Oregon's Rogue River, is examined. In this case, the dam was initially constructed by private interests during the 1920s to collect and divert irrigation water. Since then, the dam has been identified as the largest source of fish mortality for migratory salmon and steelhead trout. The BOR assumed authority for the dam's operations in 1949; the agency was charged with conducting a significant rehabilitation program for the structure. For fiscal year 2005, Congress appropriated $2.2 million to initiate planning for the construction of irrigation pumps at the dam; the ultimate plan is for the pumps to replace the dam, currently operated by a local irrigation district.

(Independent) Federal Regulation

The FERC currently regulates more than 1,700 nonfederal dams and is responsible for dam safety at over 2,600 licensed and exempted dams and related water retention structures (FERC, 2005). To examine this context, the policy change proposal to remove the Milltown Dam, located at the confluence of the Clark Fork and Blackfoot River in western Montana, is examined. In this case, the dam was built in 1907 for the purpose of generating power for sawmills that produced timbers for nearby mine tunnels around Butte, MT. Since then, pollution in the form of contaminated sediments –

including arsenic, copper, lead, zinc, cadmium, and other heavy metals – from upstream mining activities and smelters has accumulated in the reservoir behind the dam. Local wells and surface waters have been poisoned with arsenic and copper contamination has devastated area fish populations, including the federally-listed (threatened) Bull trout. The dam and surrounding area were formally listed as a Superfund site in September 1983. Soon thereafter, the site was placed on the Environmental Protection Agency's (EPA) National Priority List and the 120-mile stretch of river remains the nation's largest Superfund site; Milltown Dam represents its terminus.

In August 2005, a Consent Decree was signed between the dam's owners and relevant federal entities; it calls for the dam's previous owner to bear the majority of the $100 million-plus cleanup of the Milltown Reservoir, via removal of roughly 2.6 million cubic yards of contaminated sediments. For its part, FERC granted a license surrender order to facilitate dam removal and river restoration.

Rationale for Case Study Selection

The selection of cases in Lowry's (2003) pioneering work was based on his attempt to capture considerable variation and different combinations along the two dimensions of political receptivity to change and physical complexity (Lowry 2003, 24). There was no mention of any other criteria (i.e., region, size, jurisdiction, etc.) Rather, Lowry contended that the selection of case studies was intended to represent the different combinations of these two dimensions and capture a significant degree of variation. Besides their nationwide distribution, the rivers he studied varied considerably in length, from a minimum of forty-five miles (e.g., Washington's Elwha River) to a maximum of 2,340 miles (e.g., the Mississippi River and the ten states through which it travels).

The selection of cases in this dissertation is based on a similar, yet less varied set of rivers; they range from sixty to 320 miles in length. However, these cases differ from those studied by Lowry (2003); most critically the primary administrative agency in all four contexts has either endorsed or been compelled to initiate dam removal as the primary means of river restoration. In the final chapter, a scale involving a larger variety of actions to promote river restoration is constructed and the range in policy change magnitudes is assessed.

The case studies in this dissertation were also selected to capture variation and differing combinations along two dimensions not independently examined by Lowry (2003). Related to this dimension is the main or intended purpose(s) of the dam (i.e., hydropower versus water storage/flood control).

The second dimension is based on the size and scale of the proposed dam removal, in terms of the magnitude of the river and reservoir behind the dam in question and related scope of restoration. In essence, this measure of size/scale relates to the physical complexity and dynamism of the proposed undertaking. All cases in this dissertation involve rivers of notable size and restoration of areas both above the impoundments and below the dam structures involve considerable undertakings. Further, all dams are in excess of thirty-five feet in height. Removal of any of these would rank as the largest structure ever removed in order to provide for river restoration. Table 3.1 presents a brief breakdown of how the case studies represent different combinations and associated variation along the dimensions jurisdiction, size, and scale.

Table 3.1 – Case Study Dimensions

Structure	Jurisdiction	Size and Scale of Restoration
Elk Creek Dam	US ACOE – Portland District	• Height: 83 ft., Width: all, 2,580 ft. • No reservoir impoundment, no stored sediment. • Original purpose: Flood control. • Removal will open 55 miles of habitat for threatened Coho salmon. • Restoration involves removing a portion of the dam's spillway and left abutment, realigning the stream above and below the dam, and placing features in the stream and streambank to maintain adequate flow velocities for fish passage. The proposed notch through the dam is roughly 150 feet wide at the base and 225 feet wide at the top. • Estimated costs - $7 million for notch; $8 million for habitat restoration.
Savage Rapids Dam	US BOR – Pacific Northwest Region	• Height: 39 ft., Width 465 ft. • No reservoir impoundment • Original purpose: Water diversion – irrigation. • Removal will open 50 miles of spawning habitat on the mainstem for 5 populations of federally-listed salmon and steelhead trout and roughly 500 miles of habitat in tributaries. • Estimated costs - $5 million for removal; $6 million for installation of irrigation pumps.
Milltown Dam	US FERC (US EPA, Superfund site)	• Height: 60ft. • Current reservoir size: 820 acre-feet of water; 6.6 million cubic yards of toxic sediments. • Original purpose: power supply. • Removal will facilitate recovery of the federally-listed Bull trout and restore roughly 20 miles of contaminated river. 2.6 million cubic yards of contaminated sediment will be removed. • Estimated cost: $106 million.

Conclusion

This research has the potential to offer many benefits to the broader field of conservation. First, as a profound yet nascent expression of policy change, dam removal as a means to restore America's rivers and recover endangered species represents the surest, and perhaps ultimately, most cost-effective strategy. A wealth of scientific evidence supports dam removal and points to uncertain species recovery and continued habitat decline if current practices continue. The issue of dam removal has gained national prominence and is the subject of genuine political debate at all levels of

government. This research will contribute valuable insights into the politics of dam removal across a variety of dimensions, and speculate on which types of jurisdictional context are more or less likely to produce profound and lasting policy changes into order to respond proactively to one of today's most pressing environmental issues. Lastly in Chapters 7-8, emphasis is on the two most significant factors evidenced and used in this research to explain the variation among cases studies. Specifically, the factors of: 1) jurisdiction and 2) officials and/or policymakers may be helpful to future researchers examining the variation in policy change across administrative jurisdictions.

Notes

[1] Lowry (2003) examined a host of ACOE and BOR dams on the Missouri River in MT, ND, SD, NB, IA, KS, MO; the Mississippi River in MN, WI, IA, IL, MO, KT, TN, AR, MS; and LA; the ACOE dams on the Lower Snake River in ID and WA; an ACOE dam on MO's Osage River; the BOR's Glen Canyon Dam on the Colorado River in AZ; the National Park Service's Elwha River dams in WA; a privately-owned, state regulated dam on NC's Neuse River; and a FERC dam on ME's Kennebec River.

[2] This is in fact a basic premise of the ACF Sabatier (1988).

[3] In their study of policy implementation, Pressman and Wildavsky (1984) assert that the separation of policy design and implementation is a critical error. Rather, they argue that "each part of the chain" (e.g., the five sequential stages of the basic policy model) must be constructed and later evaluated with the other parts being wholly considered. The authors thus focused their attention on these so-called decision points, which are conceived of as involving "simple sequences of events [which] depend on complex chains of reciprocal interaction" (xxv).

[4] Later in this dissertation, I will reconsider Lowry's assertion that, based on recent CPR literature, physical size does not have a uniform affect on complexity in the context of river restoration and dam removal.

[5] The following conditions are put forth by the CPR literature; these generally suggest that the chances for resource protection are enhanced when the boundaries are clearly defined, the distribution of benefits to costs imposed is roughly equivalent, most of those affected by the situation at hand can participate in setting operational rules, monitors are effective, and sanctions for noncompliance are appropriate and consistent with local precedents (Ostrom, 1990).

[6] The bulk of existing CPR literature involves the study of cases in which individuals (e.g., resource appropriators) attempt to change their behaviors and create and submit to some form of local governance regime in order to ensure the protection and maintenance of a common pool resource. Typically, examples have included collaborative efforts by resource appropriates in forest management, irrigation, fishery and/or game management, and watershed protection.

[7] To mitigate the imminent changes of unprecedented scale that will follow removal of the Elwha dams, the federal government will fund $70 million in civil works, including a new water-treatment plant for the town of Port Angeles, WA, and a new sewer system, a raised flood-protection levee, and a fish hatchery for the Lower Elwha Klallam Reservation, located at the mouth of the river.

CHAPTER 4

Introduction

This Chapter presents a broad overview of the first of three jurisdictional contexts at the federal level in which the politics of river restoration and dam removal currently transpire; this is the Army Corps of Engineers, the nation's oldest water development and dam building agency. The Chapter opens with a brief discussion of the larger federal context, in which the Corps has been joined by the Bureau and FERC. After this general discussion, attention is focused on the contemporary Corps, in terms of its size, organization, and mission.

The second section describes the history of Corps, from a military construction agency to the nation's largest public works agency. In the process, the ACOE's engineering and construction activities came to provide the pathways for the development and settlement of the entire country. The dams it constructed mitigated flooding and provided water storage; its dredging activities and canal building enhanced navigation and facilitated travel; turbines within its structures provided hydroelectricity and expanded industries; and recreational facilities were developed at many of its project sites. At the center of this history is an ever-expanding mission for the Corps and how the agency has been able to successfully adapt and respond to a series of sociopolitical and economic changes. Despite politically-motivated reforms, competition with its main rival (the US Bureau of Reclamation), public skepticism and scandal, the Corps has remained a relevant and successful bureaucratic player.

The third section discusses how the agency has been impacted by the modern environmental movement and responded to policy mandates that it mitigate an array of

ecological damages caused by existing projects. The final section of the Chapter considers these ongoing changes, both procedurally and substantively, within the Corps and speculates on its activities in the areas of environmental restoration and dam removal. In conclusion, the current debate on whether to remove the Elk Creek Dam, situated on a tributary to southern Oregon's Rogue River, is described in the political and jurisdictional context of the ACOE.

I. The Federal Context

"The lesson of ... the Corps and the Bureau is that although dam-building agencies will go to great lengths to continue building projects for the sole purpose of maintaining their power and prestige, eventually they will overreach themselves, loose public support, and – assuming some degree of democratic control – be forced to scale down their activities to managing the infrastructure they have already built." – McCully, 1996, 247

In the context of dams and water diversion projects under federal jurisdiction, the main goal of the two primary agencies (e.g., ACOE and BOR) has historically been to promote dams in order to achieve a host of interrelated goals; involving water storage, flood control, navigation, and hydropower generation.[1] Oftentimes the related engineering and construction activities were undertaken at the expense of ecological concerns and full consideration of environmental impacts. The policy of constructing publicly subsidized dams to provide societal benefits has not so much changed in the traditional sense, but rather has come to an end. In other words, the policy option of constructing large federal dams and related structures to promote economic development and utilitarian goals has largely been terminated. According to Brewer and de Leon (1983), termination in the public sector involves "the deliberate conclusion or cessation of specific government functions, programs, policies, or organizations" (26).

Accordingly, no new large-scale federal dams have been authorized by Congress since the Colorado River Basin Project Act of 1968 and to this day, many previously authorized projects are mired in controversy and/or remain in an unfinished state.[2] This has led many to conclude that the heyday of Reclamation and Corps dam building has passed and the agencies must now shift their functions and priorities, once rooted in civil works and resource development, to the maintenance of existing structures, resource management and environmental restoration (McCully, 1996; Clarke and McCool, 1996; Bates et al., 1993; Feldman, 1991).

II. US Army Corps of Engineers

The Corps Today

The contemporary Army Corps of Engineers represents the world's largest public engineering, design, and construction management agency, with a workforce of roughly 34,600 civilians and 650 military personnel (US ACOE, 2002). Organizationally, the Corps continues to operate under the direction of the US Secretary of Army, who is the senior official at the Department of the Army and reports directly to the US Department of Defense. This individual is responsible for the effective and efficient functioning of the Army branch of the military (US Army, 2005).[3] The ACOE itself is directed by a Chief of Engineers who heads the Executive Office at the Pentagon. The Chief advises the Army on engineering matters and serves as the Army's topographer and proponent for real estate and other related engineering programs (US ACOE, 2002). Currently, this office is held by Lieutenant General Carl A. Strock, who also serves as the Corps' Commander and is responsible for defining policy and guidance, and planning the direction for the organizations within the Corps (US ACOE, 2002).[4]

Geographically, there exist eight divisions of the ACOE that are organized along watershed (rather than state or political) boundaries.[5] Beyond these divisions, the Corps currently has seventeen additional policy-oriented offices headquartered in Washington, DC and each is headed by a Staff Principle.[6]

III. A Brief History of the ACOE

The US Army Corps of Engineers was established by congressional statute on March 16, 1802.[7] This event is said to have coincided with and reinforced the nation's era of exploration, as the Corps soon became the principal agent for advancing navigation on the nation's rivers (Clarke and McCool, 1996). Indeed from its inception, the Corps assumed a central role in the protection, development, and utilization of the nation's waterways. And a somewhat lesser known role during its early years involved locating viable wagon and railroad routes to facilitate exploration of the West (Clarke and McCool, 1996). By successfully engaging in this variety of activities early in its history, the Corps demonstrated the organizational capacity that would lead to its reputation as a versatile organization able to capitalize on new missions and unforeseen opportunities (Clarke and McCool, 1996; Reisner, 1993; Feldman, 1991; Mazmanian and Nienaber, 1979).

Also coinciding with the creation of the ACOE was the establishment by Congress of a new military academy at West Point, NY in 1802. The academy served as the major, and for a while the only, engineering school and training center for civil engineering in the country (US ACOE, 2005; Feldman, 1991). Many West Point graduates would serve in the War of 1812, during which army engineers substantially expanded the system of fortifications protecting New York Harbor.

An Expanding Mission

In large part due to the successes of the ACOE's structures and other topographical engineering assignments, Congress retained the increased number of officers that it had authorized for the agency in 1812 (US ACOE, 2005). Subsequent military requests for engineering work prompted Congress to double the size of the Corps (again) in 1838. And while this work on fortifications was clearly important, the greatest legacy of the early Corps of Engineers was its work on developing the nation's waterways and roads.

From a practical standpoint, the military was the only government organization with the expertise necessary to construct canals, harbors, and roads. As a result, army engineers would become closely identified with the development of water resources (Goetzman, 1959). The agency would grow in size and clout throughout the 19th century, in-line with the expansion of river transportation, interstate commerce, and continued exploration. The canals, rivers, and roads engineered by the ACOE would come to provide the paths of commerce in the newfound republic, providing routes from western farms to eastern markets and for settlers seeking new homes beyond the Appalachian frontier (ACOE, 2005).

The Corps' original mission expanded significantly in 1824 when Congress created the Board of Engineers for Internal Improvements (BEII) and provided funds for widening the Ohio and Mississippi River channels. The Corps would soon engage in the unprecedented mission of improving navigation on the Ohio from Pittsburgh, PA to its junction with the Mississippi, and on the Mississippi itself from the mouth of the Missouri to New Orleans, LA (ACOE, 2005). This marked the beginning of a continued

accumulation of functions by the ACOE that would allow it to remain a relevant and powerful water development agency in an ever-changing political environment.

The Corps received additional duties in 1879 when Congress created the Mississippi River Commission. This assigned the agency the additional functions of supervising local flood control efforts and investigating improvements to navigation (Clarke and McCool, 1996). Pross (1938) refers to this period (1866-1882) as the "Golden Age of the Pork Barrel". During this time of unprecedented federal largesse, Presidents Johnson through Harrison signed sixteen Rivers and Harbors Acts which authorized the federal government (primarily the ACOE) to spend more than $111 million on transportation-related projects (Pross, 1938).

Reuss (2002) suggests that by the early 1880s, the fundamental working relationship between Congress and the ACOE was set, as Congress would direct the Corps to survey potential projects, make recommendations, and provide cost estimates. In order to fund both the survey and projects that were authorized, Congress passed a series of Rivers and Harbors acts during multiple sessions. This newly established relationship between the Corps and Congress would result in the construction of twenty-nine 'lock and dam' projects between 1914 and 1950 on the Upper Mississippi alone (McCully. 1996). Such engineering would transform more than 800 kilometers of river into a series of slackwater navigation pools and eventually, led to the creation of a "barge superhighway" which, in 1990 dollars, cost the federal government an estimated $12 billion (McCully 1996, 152).

The Corps' duties were further augmented in 1917 when the agency was authorized to begin flood control construction on the Mississippi and Sacramento Rivers.[8]

The next major flood control act was passed in 1928 and established what would be become the Mississippi River and Tributaries Project. As a result, the Corps began designing projects to control flooding on the lower Mississippi (US ACOE, 2005).

In 1936 Congress made the ACOE responsible for flood protection along all the nation's rivers. The same year, Congress passed the Flood Control Act which officially declared flood control and the construction of dams and reservoirs as "proper and essential" federal activities (ACOE, 2005). Furthermore, it stated that structural improvements to prevent flooding were in the public interest.[9] The Corps was assigned primary responsibility for implementing this Act, and thus was poised to become the flood control agency described by Maass (1951) as "the engineer consultants and contractors of the US Congress" (Clarke and McCool 1996, 21). In addition, a requirement of the 1936 Act specified that benefits 'to whomsoever they shall accrue' should be ascertained. It has been said that such broad language encouraged project planners to consider areas much larger than the watershed when attempting to justify multipurpose water development (Reuss, 2004). Estimates suggest that the ACOE has spent in excess of $25 billion on 500 dams and 16,000 kilometers of embankments in its efforts to structurally control flooding since the 1940s (McCully, 1996). [10]

By the early 20th century, the Corps Civil Works Directorate (successor of the BEII) had been given primary responsibility for the majority of river and harbor improvements in the US. Operating as both a civil works agency and military unit accountable to Congress, the prominence of the ACOE rose as the regional development, prosperity, and political unity its activities promoted were increasingly viewed as vital components of national security (Feldman, 1991). And according to Rourke (1984), a

direct linkage of development and national security emerged via Corps' activities, as they yielded social benefits that were tangible to laypersons, military personnel, and attentive members of Congress. After the Great Depression, the ACOE would begin to look farther West for areas in need of river modification and transportation (Reisner, 1993).

According to Feldman (1991), the developmental prowess of army engineers combined with the void of (other) bureaucratic expertise necessary for natural resource management on a similar scale, placated those in favor of using government to stimulate development of the nation's interior – prior to the ascendancy of the US BOR. Yet, Feldman argues that this reliance upon a technically proficient organization of narrowly trained experts may have served to retard "a fuller appreciation of the social, economic, and environmental impacts of water resources development" .... and exclude "consideration of nonengineering solutions to water problems [and] ignored the relation between water and other natural resources" (Feldman 1991, 9).

In addition, the Corps' continued status as an agency under the direction of military engineers connotes authority and command to its functions, which has served to highlight its prestige (Clarke and McCool, 1996).

With modifications to the Flood Control Act in 1938, the Corps' mission expanded once again. It was delegated authority to incorporate power generating facilities (i.e., penstocks and turbines) into its flood control structures (when approved by the Federal Power Commission) (Mazmanian and Nienaber, 1979). Thus began the era of hydropower in the Pacific Northwest and construction soon began on two "monumental" federal dams; Bonneville and Grand Coulee.[11] This readiness, and perhaps more critically, the organizational capacity to engage in emergent policy areas (even when somewhat unexpected) have been attributed to the long-term success of the

ACOE (Clarke and McCool, 1996; Reisner, 1993; Feldman, 1991; Mazmanian and Nienaber, 1979).

This successful entrance of the Corps into the realm of hydropower is also indicative of the so-called "bureaucratic superstars", which when national developments and policy directions dictate, "rarely turn down an opportunity to expand [their] horizons" (Clarke and McCool 1996, 20). Indeed, from its historic role as builder of coastal fortifications during the American Revolution, the ACOE would evolve into the builder of flood control works, developer of the nation's water-based transportation system, and on to preeminent builder of large dams and hydroelectric facilities across the nation.

During the Second World War, the Corps' mission grew to include more than 27,000 military and industrial projects in a $15.3 billion mobilization program; including involvement in the Manhattan Project and construction of the Pentagon (ACOE, 2005a).[12] Throughout the war-related construction program, the Corps demonstrated the capacity to handle virtually any task that was added to its ever-expanding mission (Feldman, 1991). For example, from 1940 – 1941, the Corps became the construction agent for the Army Air Corps; initially, and then for the entire War Department (ACOE, 2005a).[13] Shortly thereafter, the Corps gained additional responsibility for all military real estate.

In addition to its war-related activities during this era, the ACOE was authorized to develop 'public use' facilities at its projects in 1944. This gave the agency a nationwide role in the creation and maintenance of recreational facilities. By the mid-1970s, the Corps would become the leading agency in water based recreation and the

second largest federal agency (after the US Forest Service) in providing recreation facilities (Buck, 2005). Additionally, the 1946 Fish and Wildlife Act further broadened the Corps' mission by requiring it to cooperate with the U.S. Fish and Wildlife Service and various states in preventing and/or mitigating damage to these resources.

Despite initial attempts by the Roosevelt and Truman administrations to gain greater executive control over the powerful and largely independent ACOE, the agency and its congressional supporters succeeded in keeping it away from the control of the Interior Department (Clarke and McCool, 1996). President Eisenhower also sought to limit the federal role in water and power development and preferred to confine federal assistance within the small watershed program of the Soil and Conservation Service (Reuss, 2004). In addition, the Hoover Commission sought to place all federal agencies involved with public works (including the ACOE) within the Interior Department and similarly, President Nixon proposed creating a Department of Natural Resources that would have total control of planning and policy for civil works. Despite these repeated attempts to challenge the status quo and reduce the Corps' autonomy in particular, its duties actually continued to expand (Clarke and McCool, 1996).

The Appetite for Pork and Dams

"Public works projects have been singled out as especially pork-laden, perhaps most notable among them the Army Corps of Engineers" – Hird 1991, 429.

As the commercial interests profiting from the services provided by Corps (and other federal) dams steadily increased, so too did the number and strength of professional organizations lobbying for their construction. The first water development lobby group in the US was likely created in 1901 to lobby for ACOE projects (McCully, 1996).[14] This initial support came from local trade and industry bodies, barge owners, political

elites, and cities in need of flood control. Together with these early constituencies, water supply utilities and agribusiness interests would combine into a powerful force in the lobbying of elected officials for funding and continued water development (McCully, 1996). And in the US Congress, the time-honored practice of *quid pro quo* politics would quickly take root in this domain as members jostled to secure federal funds and water projects in their home districts. Former Speaker of the US House of Representatives Tip O'Neill (D)-MA characterized this essential nature of pork barrel (distributive) politics through a reference to legendary Speaker Sam Rayburn (D)-TX:

"Sam Rayburn could make a call and the Army Corps of Engineers would go to work. Rayburn would take care of the little detail of an appropriation later" (Matthews 1988, 50).

For decades, a host of scholars have portrayed federal water projects as the pork *par excellence* for US politicians (McCully, 1996; Clarke and McCool, 1986; Reisner 1993; Freejohn, 1974; Drew, 1970; Maas, 1951). And while the 'pork barrel' in politics has been variously defined, a common thread involves the practice of certain legislators, by virtue of their committee positions, to gain funding for their districts or states at the expense of the nation as a whole.[15] Characteristic of pork barrel politics, water projects were (and continue to be): easy to justify and linked to socioeconomic development (e.g., flood control, navigation, irrigation, hydropower, recreation); planned on regional bases to benefit limited constituencies; hugely expensive yet publicly subsidized; and constructed by powerful federal agencies (which may shield information from the public and defeat most opposition). According to Reisner (1993), water projects,

"were the oil can that lubricated the nation's legislative machinery. Important legislation – an education bill, a foreign aid bill, a conservation bill – was imprisoned until the President agreed to let a powerful committee chairman tack on a rider authorizing his pet dam" (174).

Traditionally, water projects such as dams, canals, and flood control structures have emerged from Congress in large part because of support from a strong tripartite alliance of congressmen (notably members of the Appropriations and Public Works committees), federal agencies charged with construction and maintenance, and water-related constituency groups. This so-called 'iron triangle' or subgovernment of symbiotic interests has often been criticized for ensuring the Congressional authorization of many unnecessary pork barrel projects (McCully, 1996; Clarke and McCool, 1996; Reisner 1993; Freejohn, 1974; Drew, 1970; Maas, 1951). Moreover, such projects are often environmentally destructive and extremely questionable in terms of cost-benefit ratios and their overall value to society at large. Nonetheless, these types of projects are the ingredients for pork barrel politics and have been shown to effectively galvanize support of incumbent congresspersons on a regional basis (Clarke and McCool, 1996; Reisner, 1993). According to a recent documentation of Congressional support for dam-building over the past century, "... there was no more certain bet on Capitol Hill than money for dams" (Pope 1999, 1707).

The 1936 Flood Control Act actually set off the grand dam-building era in American history (Reuss, 2004). Initially it authorized the Los Angeles Flood Control System, dams in New England, and a host of dams in the upper Ohio River valley. Subsequent amendments during the following decade authorized the ACOE to construct some of the largest dams on the largest river systems on the planet, including a series of dams on the Missouri and Columbia rivers. These included: Fort Peck (1940), Garrison (1956) Fort Randall (1956) Oahe (1962) and Big Bend (1963) dams on the Missouri River; the Bonneville (1938), Dalles (1952), McNary (1954), Chief Joseph (1955), and

John Day (1971) dams on the Columbia River; and the four Lower Snake River dams (1960-1975). According to Reuss (2004), these and other large-scale ACOE projects eventually numbered in the hundreds and together signified a major shift in the federal contribution to water projects. By 1969, the federal government had contributed over $87 billion to water development projects across the country (Reuss, 2004).

And while the 1936 Act authorized only single-purpose flood control projects, the majority of dams and reservoirs constructed thereafter would become multipurpose in their operations (Reuss, 2004). Initially, many working within the ACOE objected to multipurpose dams and water projects due to both constitutional and technical concerns.[16] Despite such concerns however, the vigor of the Corps appeared undiminished in 1927 when Congress authorized the agency to prepare general multipurpose plans to improve navigation, waterpower, flood control, and irrigation (and eventually recreation) for all the navigable rivers of the US that appeared capable of supporting hydropower (Reuss, 2004). Over the ensuing decades, the ACOE would release hundreds of '308 reports' (named after the House document in which the cost estimates for ACOE plans first appeared), which would set the precedent for multipurpose water development for the next 30-40 years (Reuss, 1992).

Multipurpose planning for ACOE projects presented additional motives for members of the US Congress to aggressively pursue them in their districts and states. Not only could congresspersons rationalize the need for multipurpose water development from a variety of standpoints (e.g., flood control, water supply, navigation, hydropower, recreation), but the Corps could justifiably tap into a diverse constituency of potential beneficiaries, thus making it more widely attractive to business and political interests

across the country. According to Clarke and McCool (1996), the cultivation of such a broad-based constituency has allowed the Corps to effectively respond to new challenges and shifting policy priorities. However, Reisner (1993) suggests a result of such a broad and multifaceted workload is that many of the Corps' contemporary activities effectively cancel each other out. As such,

> "Its [ACOE] dams control flooding, while its stream-channelization and wetlands-draining programs cause it. Its subsidization of intensive agriculture – which it does by turning wetlands into dry land, so they may then become soybean fields – increases soil erosion, which pours into the nation's rivers, which the Corps then has to dredge more frequently" (Reisner 1993, 172-173).

Another, more prominent criticism of the ACOE stems from the agency's political alliance with certain Congressional committees and interest groups and its related track record of spending federal funds. Because of its constant increase in responsibilities and expansion of traditional roles, the annual operating budget of the Corps has grown tremendously. Perhaps the largest increase occurred in the late-1970s, when the Corps' budget skyrocketed. The agency estimated its 1980 budget at $3.2 billion, which included $1.7 billion for construction of more than 200 projects, including river and harbor improvements, locks, dams, reservoirs, flood protection, and hydroelectric power generation (Clarke and McCool, 1996).

Executive Challenges to the Status Quo

In an attempt to confront the system of pork barrel spending and its source within tripartite subgovernments or iron triangles, President Carter issued his infamous 'hit list' for some eighteen ongoing federal water projects in 1977. Eleven of the initial eighteen projects belonged to the Corps. And despite an immediate and strong protest by Western governors and influential congresspersons from the Southern and Western states, Carter

announced that fourteen additional projects would come under review, ten of which were Corps projects (Clarke and McCool, 1996).[17]

Carter entered the White House during a period when the cumulative federal debt was nearly $1 trillion and inflation had already reached the double digits, yet all the while federal water bureaucracies were spending roughly $5 billion per year (Reisner, 1993). In response, Carter entered office with the intent of streamlining the federal budget by taking on the water establishment in Congress and specifically, by targeting specific dams he saw as largely unnecessary and often justified by deceptive cost-benefit analyses of the Corps.

First, Carter took aim at the Corps' cost-benefit formula and its interest rates. By law, a rate of 3.25% was to be applied to any project authorized prior to 1969, regardless of whether funds for the project were appropriated at a later date when rates would presumably be higher. Prior to Carter's action, the interest rate was raised to 6.37% in 1974 yet the President wanted it raised to 10% (Clarke and McCool 1996, 29).

Second, President Carter proposed a series of additional reforms to the nation's water policy and public works domain. Specifically, he sought to promote a heightened emphasis on environmental protection, an increase in dam safety, a greater emphasis on water conservation, a program of increased cost sharing among states and the federal government, and a complete redirection of the nation's public works program.

Clarke and McCool (1996) maintain that the first three reform proposals posed little threat to the Corps and discuss how the agency promptly incorporated them into its expanding set of responsibilities. Nonetheless, the final two reforms posed a serious threat to the traditional function and modus operandi of the ACOE. Specifically, the cost

sharing provision would force beneficiaries of federal water projects to pay some portion for their construction and use. If passed, this would have eliminated the primary feature of Corps projects which made them so attractive to Congress and project recipients – namely that the cost of a dam is borne by society at large while its benefits are concentrated in a specific area. In addition, in an effort to redirect the nation's public works system, Carter sought to relocate most of the Interior Department agencies and the ACOE to a newly-created Department of Natural Resources (DNR). Such a structural change would have greatly increased executive control over the Corps by reducing its autonomy and disrupted the well-established relationship the agency had within certain committees within Congress. As an additional component of this reform initiative, Carter strove to expand the role of the Water Resources Council (WRC) so that it would serve as the final arbiter in deciding which projects were recommended by the Corps to Congress for funding.

By most accounts, Carter's reform efforts directed towards the ACOE had little lasting impact on the agency (Clarke and McCool, 1996; Reisner, 1993). Perhaps most critically, Carter was unsuccessful with the two reforms that would have most reduced the autonomy of the Corps and disrupted its traditionally cozy relationship with Congress. The relative lack of cost-sharing provisions that have enabled the Corps to become so powerful over the years emerged unchanged, a cabinet-level DNR was never created, and role of the NWRC was not enlarged.

While Carter's challenge to the status quo of American water policy failed to produce these two structural reforms, it did highlight the Corps' unique ability to successfully adapt to the changing times in regards to environmental policy. In this

sense, and continuing a trend that had begun with the onset of the mainstream environmental movement of the late-1960s and early-1970s, Carter's reform initiatives did have a lasting impact on the operating procedures and structure of the ACOE.

In response to increased public and political concern over environmental degradation, the Corps established its Environmental Effects Laboratory (EEL) in the mid-1970s (Clarke and McCool, 1996). The EEL would grow into the Environmental Laboratory (EL) and function as the main problem solver for the Corps and the nation in environmental science and engineering research and development in support of environmental systems.[18] Prior to this and in the larger context, the Crops had again demonstrated its ability to dynamically respond to changes in the sociopolitical context, this time through its reaction to the mainstream environmental movement and in particular, to NEPA and the EIS requirement. In sum, the Corps' response to these potentially destructive and demoralizing developments (in the context of its construction and engineering activities and traditional methods of operation) has been described as prompt, innovative, and impressive (Clarke and McCool, 1996; Taylor, 1984; Mazmanian and Nienaber, 1979; Wichelman, 1976; Andrews, 1976).

IV. The Corps in a post-NEPA landscape

The impact of NEPA on the operations of the federal bureaucracy was undeniable. However, the changes this prompted in behaviors and activities across the public sector (along with other policies of the "environmental decade") were far from equal. Rather, bureaucratic responses varied, with some organizations reacting more proactively and affirmatively than others. Over thirty years of research has consistently identified the US ACOE (either separately or together with US Forest Service) as the

bureaucratic player that responded most promptly and completely to the drastic shift in policy direction (Andrews, 1976; Mazmanian and Nienaber, 1979; Taylor, 1984; Clarke and McCool, 1996; Lowry, 2003). The Corps made serious and sustained efforts at incorporating environmental values into its activities, albeit with some backsliding.

Examining the response of federal agencies to NEPA, Andrews (1976) developed two criteria; the extent to which the law's procedural requirements were incorporated and the extent to which this led to outcomes consistent with NEPA's policy goals. The response of the Corps was found to be swift and complete (at least in regards to procedural requirements). Specifically, the Corps was portrayed by Andrews as having interpreted NEPA as a mandate to be reflected in its plans and decisions (1976). In this sense, the agency took the position that the Act created a new criterion for federal action, authorizing it to consider a broader range of effects than had been considered previously. Further, the Corps directed recognition of environmental quality as a new objective for planning and requested funds and personnel to carry out its new responsibilities. According to the testimony of the Corps' Director of Civil Works:

"It wasn't until the passage of NEPA that we really had in our hands the authority to spend money, time, and effort in this field [environmental protection] over and above what were the precedent-setting studies in which economic development and the benefit-cost ratio were the be-all-and-end-all."[19]

Moreover, Andrews portrayed the Corps as having responded immediately and affirmatively to NEPA's procedural requirements, particularly that of the EIS, and as having made early and sustained policy commitments to their implementation (1976). In fact, by 1974 the Corps' guidelines for preparation of EISs were characterized as exemplary among federal agencies (Andrews, 1976). And while the Corps' approach imposed a heavy paperwork burden on its staff and generated a large number of

superficial documents, Andrews argues that this approach forced a "learning process" throughout the organization by necessitating that NEPA-related questions be considered in conjunction with program decisions (1976). Yet in regards to the extent of substantive change, Andrews found that the actions taken by the Corps in response to NEPA focused almost exclusively on the Act's procedural requirements, rather than policy goals, and particularly on procedures for the preparation of EISs (1976).

In addition, Andrews' work suggests that few substantive changes in proposed water projects were made by the Corps. For example, ACOE survey responses between 1971 and 1974 indicated that less than one-fifth of the projects for which EISs had been prepared were affected in any substantive way (Andrews, 1976). Additionally, non-structural policy alternatives (i.e., floodplain management, wetlands restoration, removal of food-prone homes) were rarely considered.

Mazmanian and Nienaber (1979) conducted a similar study four years later and arrived at a somewhat different conclusion. They maintain that soon after passage of NEPA, the Corps had made concerted efforts to comply with both the *spirit* and the *letter* of NEPA. For example, the agency issued calls for greater public involvement and environmental awareness in the decisionmaking process.[20] Indeed, their account of the ACOE in a post-NEPA landscape portrays the agency's response as having materialized quickly, in clear contrast to the more common glacial pace of bureaucratic change discussed by others (e.g., Wilson, 1989).

In order to measure this apparent change within the Corps, Mazmanian and Nienaber developed four factors said to be indicative of change (1979). The first involves the initial step of setting new goals and guidelines, which the authors state was

met by the Corps. Specifically, the agency was said to have responded to new demands by calling for dramatic changes. This was mainly evidenced through the setting of new objectives for environmental awareness and with calls for the integration of "open planning" by the Corps. The most pronounced movement in this direction allegedly came from the Office of the Chief of Engineers, through both the publicizing of changes and the charting of the agency's new course of action (Mazmanian and Nienaber, 1979). Similarly, others have documented how new agency rules and guidelines were often issued by the Corps prior to, and often in excess of, those required by NEPA and CEQ (Wichelman, 1976).

The second criterion for change involved reorganization within the Corps and the infusion of new personnel with different values and training in the agency. It has been argued that via new personnel, ideas once regarded as unorthodox may legitimately be voiced from within an organization (Mazmanian and Nienaber, 1979; Espeland, 1998). Regarding structural changes within the Corps, Mazmanian and Nienaber suggest that internal reorganization had occurred to such a degree that by 1979, that it possessed the organizational capability necessary to incorporate environmental policy considerations. Specifically, ACOE had successfully incorporated both new personnel with non-engineering backgrounds into the agency and established an advisory board of planning and environmental professionals to consult with a range of interest group representatives (Mazmanian and Nienaber, 1979). Prior to this, the Corps' civil planning had customarily been restricted to the cadre of a project's economic and political beneficiaries.

This initiation of "open planning" for new projects by the Corps in 1970 was expected to change the status quo in the Corps' traditional civil planning which customarily was restricted to the cadre of a project's economic and political beneficiaries. By encouraging broad public and private participation, the Corps provided opportunity for the public to define a host of "environmental viewpoints" (Mazmanian and Nienaber 1979, 161). This was a clear concession to environmentalists and in particular, a response by the Corps to its new statutory obligation for preparing EISs on new projects. Others have described this as an attempt by the Corps to turn adversity to advantage (Clarke and McCool, 1996). In this sense, the Corps embraced the so-called "participation thesis", whereby open planning was seen as a way to facilitate public consensus on project proposals and as a consequence, hasten their congressional authorization (Mazmanian and Nienaber, 1979). For these reasons, it has been argued that the Corps had made a fundamental attempt to cope with environmental considerations by altering its formal organizational structure (Mazmanian and Nienaber, 1979; Clarke and McCool, 1996).

Taylor (1984) identified the public review component of the EIS requirement as the mechanism whereby external pressure would now (post-NEPA) compel federal agencies and other project proponents to perform candid environmental assessments. By simply knowing that their projects were likely to be criticized publicly in the post-NEPA era, project proponents are more likely to anticipate objections early in the planning process and to respond accordingly (i.e. by improving project design prior to releasing EISs).

Similarly, the post-NEPA political landscape has exposed the Corps to the real or perceived threat of litigation as a means to enforce compliance with EIS requirements. Legal action by both environmentalists (Wichelman, 1976) and government agencies (Andrews, 1976) has been identified as mechanisms which have prompted environmental review of Corps' projects in the years immediately following the "environmental decade". The ability of citizens to sue federal agencies required to perform environmental assessments of their projects and operations is discussed by Ortolano (1993) to have resulted in a high rate of procedural compliance for EISs in the US shortly after the passage of NEPA.

The third criterion used by Mazmanian and Nienaber to assess the Corps in the immediate post-NEPA landscape involved the relative presence of changes in the agency's substantive outputs. They cite many examples of ongoing projects (circa 1973-78) that were either delayed or modified by agency personnel as a direct result of commitment to NEPA. Moreover, examples were given on how the Corps initiated extensive planning efforts for the first time in the areas of wastewater treatment, mixed approaches to floodplain management (i.e., both structural and nonstructural), and recreation (Mazmanian and Nienaber, 1979).

The final criterion for change involved the presence of an open and transparent decisionmaking process. Mazmanian and Nienaber discuss this and the Corps' commitment to change with less certainty (1979). Despite attempts to institute a limited number of comprehensive open planning efforts, the Corps' requirements for public participation in its planning were modest. This led Mazmanian and Nienaber to conclude that a revitalization of external pressure, mainly of the sort generated during the late-

1960s and early-1970, would have been necessary to prompt the agency to institute an agency-wide open planning program. In addition, Mazmanian and Nienaber portrayed the Corps as having exhibited real signs that its initial endorsement of open planning for new projects after 1974 had weakened after it recognized that the technique failed to assure consensus on projects or widespread support for its favored project designs (1979). Roughly two decades later, Lowry (2003) expressed similar reservations about the extent of change with the ACOE. He states that the Corps remains "torn between past traditions and new demands [and] as a result, it is a fairly schizophrenic agency, with some offices pursuing traditional goals and others adopting new ones" (50).

Competition with the US Bureau of Reclamation

"The extent to which the original aims of the two main dam-building agencies in the US – the Corps and the Bureau of Reclamation – became lost to the instinct of bureaucratic self-perpetuation is shown by the intense rivalry which developed between them" – McCully 1996, 244.

Reminiscent of the sociopolitical theories of Weber (1968), as the two main federal dam building agencies operated during the heyday of dam building (1940s-1960s) they increasingly lost sight of their original aims and arguably began to confuse means with ends. Furthermore, as quality dam sites dwindled in number and without Congressional authorization of new projects, the agencies' budgets would surely be cut and their prestige diminished. As a result, an intense rivalry for self-preservation developed between the Corps and the Bureau as each became increasingly intent on securing funds for the future construction of its dams and water projects. Oftentimes this competition resulted in the construction of ill-conceived and unnecessary projects simply because one agency feared that the other would secure funding and initiate construction first.

It is well documented that this overriding need to secure funds and find projects to construct on behalf of each agency involved increasingly desperate and dishonest tactics (e.g., Clarke and McCool, 1996; McCully, 1996; Reisner, 1993). According to Reisner (1993),

"Across the entire West, the Corps [was] as opportunistic and ruthless an agency as American government has ever seen, trying to seduce away the Bureau's irrigation constituency..." (171).

Initially however, the Corps confined the majority of its planning and engineering activities to the East and Midwest portions of the US, while the Bureau was subsequently mandated to begin water development in the seventeen Western states at the beginning of the twentieth century. This regional pattern lasted roughly until the Great Depression, after which Reisner (1993) states "the temptations of the West ultimately proved too much [for the Corps] to resist" (173). Hence began the era of competition and rivalry as the Corps moved farther West and vigorously lobbied for construction projects on the Missouri and Columbia Rivers and perhaps most intensely, on rivers in California's Central Valley and southern Sierra Nevada (Reisner, 1993).[21] In the process, hundreds of millions in public funds were spent on many of the most objectionable and environmentally harmful projects west of the 100th meridian.

The conservative, anti-government sentiment that characterized the Reagan administration had a dramatic impact on federal spending in general, and the Corps in particular. Beginning in the early 1980s, the Corps was increasingly portrayed as wasteful, unbridled, self-serving, and corrupt by various conservative elements of the population which had traditionally supported the agency and its projects (Clarke and McCool, 1996). In addition, its record of competition and rivalry with the Bureau for

federal 'pork' and questionable projects served to bolster the concerns during this era of uncontrolled federal largesse. Many political leaders, including the President, believed it necessary to fundamentally alter the way the Corps had come to operate. In particular, reformers insisted that the beneficiaries of ACOE projects pay at least some part of the overall cost of construction (Clarke and McCool, 1996).[22]

In 1986, the Water Resources Development Act (WRDA) was passed by Congress. It was hailed as "the most significant water resources development bill in over 50 years" (Congressional Record, 1986). Among the Act's most significant reforms were: a mandate for cost-sharing that required nonfederal sponsors of a project to pay between 25 and 100%; the automatic deauthorizing of hundreds of unfunded projects; limitations on cost overruns (a persistent problem with the Corps); firm ceilings on annual construction spending; a requirement that fish and wildlife mitigation occur simultaneously with construction, and not merely as afterthoughts; the elimination of "regional benefits" in ACOE benefit-cost analyses (which previously allowed the Corps to hugely inflate project benefits); the creation of an Office of Environmental Policy in the Civil Works Directorate and establishment of an environmental mitigation fund; and a provision authorizing the Corps to modify existing projects to enhance environmental quality (Clarke and McCool, 1996).

By most initial accounts, the 1986 Act was revolutionary because it fundamentally altered the nature of the Corps political environment. Perhaps most notably, the cost-sharing provision gave local sponsors of a Corps project a powerful material incentive to be cautious and sensible in their choice of projects (Clarke and McCool, 1996). In addition, the Act mandated a number of expanded environmental

responsibilities for the Corps. Roughly a year after the Act took effect, a high-ranking ACOE general testified the following in Congress.

"We have lost through this bill the epithet of pork. It has changed the way we do business" (Clarke and McCool 1996, 41).

V. The Corps' Environmental Programs Today

"These days, some of the prime opportunities are in restoring, not structuring, rivers" – Lowry 2003, 50.

According to Lowry (2003), there exist at least three main reasons why ACOE behavior has likely changed. First, for more than fifty years the Corps has been required to justify its projects via cost-benefit analyses. Second, the operations and decisionmaking process of the Corps are now far more open and participatory as a result of the environmental decade (1960s-1970s). And third, as Clarke and McCool (1996) and others have documented, the ACOE has consistently been opportunistic in pursuing new mandates, and ecological concern has for the most part been no exception.

In the contemporary ACOE, the Engineer Research and Development Center (ERDC) is charged with the development of innovative science and technology solutions to support the environmental operations of the Corps (ACOE, 2005b). The ERCD consists of eight separate laboratories. Of these, the Environmental Laboratory (EL) is responsible for supporting the environmental missions of the ACOE by providing assistance on virtually any aspect of the agency's planning, regulatory, or maintenance projects (US ACOE, 2004a). In addition, the EL provides assistance regarding environmental mandates affecting defense installations.

Within the EL there exists the Ecosystem Management and Restoration Research Program (EMRRP). This is the research program of the ACOE that helps decisionmakers

evaluate and mitigate the environmental impacts of Corps water resource development activities at the ecosystem level. It represents the Corps' self-described

"Responsive, tactical research and development response to the demand for new and expanding technologies to address the need for ecosystem assessment, restoration, and management activities at the project level" (US ACOE, 2003a).

The EMRRP is targeted toward ecosystems of particular concern to the Corps, which are said to include streams, riparian corridors, wetlands, and special aquatic sites (US ACOE, 2003a).

Continuing Skepticism

Recent pressures have urged the Corps to take a much more aggressive and proactive (nonstructural) stance to promote river restoration and species conservation. In the Pacific Northwest, pressure has mounted over the last decade for the Corps to drastically alter its traditional policies of river management and pursue the policy option of dam removal or breaching to address the imperiled status of native anadromous fish populations (Clark, 2004; Lowry, 2003; Wilkinson, 1992). Support for this dramatic policy change has emanated nationally and internationally from environmental groups, fiscally conservative taxpayers and politicians, members of the scientific community, and Native American tribes.

The primary demand is for the Corps to abandon its thirty-plus-year (and largely unsuccessful and extremely costly) regime centering on technological fixes (i.e., fish screens, ladders, hatcheries, and the barging of smolt) and begin to implement partial dam breachings as *the* means to ensure anadromous fish recovery. To date, the agency has displayed some movement in the direction of breaching or outright dam removal, mainly for its smaller water projects situated on tributary rivers.

Despite the apparent willingness of the ACOE to endorse dam breaching or removal as viable policy alternatives, misgivings continue to be voiced about the perceived permanence of dams and the legitimacy of the Corps' efforts to restore rivers and native fish runs. Indeed this mounting concern has spawned legislative action. In February 2001, six US House of Representative members launched a Corps Reform Caucus aimed at ensuring that the agency's construction projects are increasingly environmentally sensitive and less wasteful of taxpayers' dollars. The stated mission of the Caucus was to provide a forum for interested members of Congress to work together toward a financially and scientifically accountable Army Corps of Engineers (American Rivers, 2005c). Currently in the 109th Congress, the Corps Reform Caucus is co-chaired by Rep. Earl Blumenauer (D) OR – 3rd and Rep. Ellen Tauscher (D) CA – 10th.

In March 2001, a bipartisan group of lawmakers led by Sen. Russ Feingold (D) – WI and Representative Ron Kind (D) WI – 3rd introduced bills (*S. 646 and H.R. 1310*) intended to revamp the Corps. Most notably, these would have mandated independent review of large and controversial Corps' projects by a panel of experts (Taxpayers for Common Sense, 2001). Moreover, the intent of the bills was to direct the Corps to fully replace wildlife habitat destroyed by their projects and aim to ensure that projects meet both economic and environmental goals and engage local interests in project planning (American Rivers, 2005c). And while this bill failed to make it out of committee, there have been related bills proposed each session in a bipartisan manner with similar intentions, yet none have become law.[23]

Recent scandals within the Corps have further motivated reform efforts. For example, in March 2000 three senior Corps officials were reprimanded for manipulating

the results of a major study to determine whether a $1.2 billion lock expansion project on the Upper Mississippi was justified. In May 2000 the Army Inspector General and the National Academy of Sciences released separate reports that severely criticized the Corps' conduct on the Upper Mississippi River study and of the agency's planning process in general. In this highly publicized case, it was disclosed that ACOE economists were coerced to manipulate the data regarding the proposal in order to gain a favorable cost-benefit ratio. The Inspector General concluded that there existed an institutional bias towards building the largest projects possible which created "an atmosphere where the objectivity in its [the Corps'] analyses was placed in jeopardy" (Taxpayers for Common Sense, 2001). And in June 2002, a report from the Government Accounting Office (GAO) harshly criticized ACOE justifications for a project to deepen the Delaware River. Specifically, it cited "miscalculations and the use of significantly outdated information" (National Academy of Sciences 2001, 3). Taken together, such recent scandals and ongoing pressures from Congress to reform support the skepticism expressed previously by others on the degree of lasting change within the ACOE (e.g., Mazmanian and Nienaber, 1976).

Regarding contemporary ACOE activity in the western US, a 2002 GAO report found that the agency had dramatically miscalculated the costs and benefits of the Sacramento Flood Control Project in California. Barely justified with a 1.1 benefit-cost ratio, the project was found to cost at least five times the original Corps' estimate. The report also found that the Corps failed to provide Congress with cost overrun information in a timely manner. In the Pacific Northwest, a six-month review by the Portland *Oregonian* of the economics of the $188 million Columbia River channel deepening

project revealed that the Corps had overestimated the project's benefits by 140 percent. In addition, the Corps told the public that the project would return $2.10 for each dollar of public money invested. In contrast, the newspaper found that the project would return just 88 cents for each tax dollar spent (American Rivers, 2005c).

VI. New Missions and Reforms for the 21st Century ACOE

The array of environmental laws passed during the previous 30-plus year period has presented a number of new challenges and opportunities for the modern ACOE. According to Clarke and McCool (1996), the agency has embraced a number of opportunities in at least four general programmatic areas (i.e., wetlands protection; infrastructure maintenance and development; environmental restoration and protection; and regional water management).

The involvement of the ACOE in the nation's wetlands program began in 1972 when Congress passed the first of several bills that have come to be known as the Clean Water Acts. Specifically, section 404 of the 1972 Act requires that any party with intentions to deposit "dredged or fill material" into navigable US waters must first receive a permit from the ACOE Chief of Engineers (US FWS, 2005). In conjunction with three other federal agencies, the ACOE administers this 404 Wetlands Program.[24]

In the contemporary era, the Corps has also capitalized on a new mission regarding the maintenance and development of the nation's public transportation network, including waterways, water supply systems, and other public structures (US FWS, 2005).[25] Additionally, the contemporary ACOE will continue to be involved with environmental mitigation and protection activities at its array of existing structures and projects, perhaps most dramatically in Florida and the Pacific Northwest. In this sense,

"the agency may very well spend its second 200 years cleaning up damage from its first 200 years" (US FWS 2005, 44).

A final area of growth for the contemporary ACOE has centered on the shift from water development activities to water management (US FWS, 2005). In this context, the former structural activities of the Corps such as dam construction have transformed into alternative nonstructural activities such as regulation, planning, and efficiency enhancement at existing structures.

Despite these and other new opportunities areas of activity for the modern ACOE, many of which have resulted in progress in environmental restoration and protection, pressures to further reform the agency continue. For example, one of the leading non-profit conservation organizations in the nation, American Rivers, is fronting a nationwide effort to reform the Corps. The effort promotes greater accountability for protecting rivers to ensure that future projects reflect the highest standards, are economically justified, and environmentally sound (American Rivers, 2005c). The non-partisan budget watchdog group Taxpayers for Common Sense has joined the list of conservation organizations in criticizing the Corps' traditional practices. The group has formed the "CorpsWatch" project to promote taxpayer savings by cutting wasteful spending and subsidies at the ACOE (Taxpayers for Common Sense, 2005). American Rivers is also a partner in the Corps Reform Network, which consists of over 130 local, regional, and national organizations and works to advocate changes in the policies and practices of the ACOE. More specifically, the Network seeks to ensure that the agency ceases the promotion of projects and issuance of permits that waste taxpayers' dollars and degrade America's water resources (Corps Reform Network, 2005).

VII. ACOE Dams and Pork

According to McCool (2004), "Elk Creek Dam is the perfect example of pork-barrel water politics, born in an age when politicians equated dam building with re-election ... a symbol of how difficult it is to change a mindset and overcome the inertia of a hundred years of pork-barrel water policy." And the ongoing battle over the fate of the still-unfinished Elk Creek Dam involves a tortured history; it has been fought by proxy at the federal level in Congress, the courts, and bureaucracy.

Elk Creek Dam

"Even the [ACOE] *– which for decades had advocated building just about any structure that was technically feasible, regardless of its environmental consequences – decided that it would really rather not build this one"* – Jacobson (1998).

The Elk Creek Dam was one of three Corps' dams in the Rogue River Basin Project (RBP) authorized by the omnibus 1962 Flood Act.[26] The dams were primarily designed to control regional flooding; auxiliary purposes included power production, recreation, and irrigation. Initial supporters of the project included the Rogue Basin Water Resources and Flood Control Association and former, five-term US Senator Mark Hatfield (R-OR), who served as Chairman of the full Appropriations Committee from 1980-1986. Senator Hatfield, along with many of his constituents, had witnessed a series of devastating floods in the Medford, OR area during the late-1950s and early-1960s and in large part, this explains their unqualified endorsement of the project and continued firm support for the dam – despite its unfinished status (Jacobson, 1998).

The dam was authorized by Congress in 1962 yet construction was not initiated until 1986. During this period of time, the Corps was occupied in constructing the first dam authorized by the RBP; the 327-foot-high Lost Creek Dam on Oregon's Rogue

River was completed in 1977.[27] The 249-foot-high Applegate Dam on Oregon's Applegate River was the second dam authorized and was completed in 1980.

Subsequent to completion of these projects, the Corps refocused its attention on Elk Creek, yet the agency soon recommended against its completion due to an unacceptable incremental cost-benefit ratio; because Elk Creek was the last dam added to the river system, its need for flood protection had been diminished (Buck, 2005). A report issued by the US Government Accounting Office (GAO) in the early 1980s confirmed earlier analyses of the Corps that projected the cost-benefit ratio at five-to-one; $5 of costs for every $1 of conceivable economic benefit. In addition, ACOE maintained that the initial primary purpose of the dam, flood control, was no longer needed due to completion of the other two projects in the same river basin (ONRC, 2005).

An auxiliary purpose in the original appropriation for the dam was to store irrigation water. This too had become obsolete; as early as 1975, the Corps had withdrawn irrigation as a potential economic benefit; bolstered by previous studies of the BOR which found the plan for irrigation to be infeasible (ONRC, 2005). As a result, Elk Creek dam was listed on President Carter's infamous 1977 'hit-list' of federal water projects perceived as largely unnecessary and ill-justified by deceptive cost-benefit analyses.[28] The dam was again targeted again in the early 1980s when Congress nearly voted to axe the project altogether, it came just ten votes shy (Buck, 2005). And to this day, the reservoir created by Lost Creek Dam continues to impound a tremendous volume of unclaimed and thus un-appropriated water; this renders obsolete the need for any additional storage capacity that would come with a finished date at Elk Creek (Buck, 2005; Klatte, 2005).

Nevertheless, support for the dam's completion has endured. In fact Senator Hatfield was successful in securing a $15 million appropriation from Congress to initiate construction of Elk Creek Dam in 1986 – despite ACOE's previous decision to stop budgeting for the dam (ONRC, 2005). In response, the Oregon Natural Resource Council (ONRC) led a suit to halt construction; alleging broad NEPA violations. Soon thereafter the suit was dismissed by a federal District Court and construction formally began in 1987.

Less than a year later, the Ninth Circuit Court of Appeals reversed this ruling and formally enjoined construction of the dam beyond one-third of its desired height. This ruling was overturned two years later in 1989; this time by the US Supreme Court. A year later, ACOE completed its second supplemental EIS on the dam, which prompted then-Oregon Governor Barbara Roberts, along with the state's Department of Fish and Wildlife and the US Fish and Wildlife Service (FWS) to call for the unfinished dam's complete removal. This was followed by a joint statement from the USFS and Bureau of Land Management indicating that the dam "unreasonably diminishes wild anadromous fish in the federally-designated Wild and Scenic Rogue River" (listed by Congress in 1968). This prompted the US National Marine Fisheries Service (NMFS), the agency responsible for ensuring the survival of threatened and endangered catadromous species to call for the dam's removal (ONRC, 2001). A subsequent federal lawsuit demanding the dam's removal was filed in 1992. Ironically, that same year, Congress appropriated $2.5 million and instructed the Corps to begin activities for the dam's completion, pending removal of the 1987 injunction as requested by the US Department of Justice (ONRC, 2005).

To Breach or not to Breach

For its part, the Corps has long-since recommended that plans to finish the partially-completed dam be abandoned and that the existing structure (at a current height of eighty-three-feet) be permanently breached or 'notched' to provide for uninterrupted, passive (e.g., hands-off) fish passage (Klatte, 2005; Buck, 2005). This notch-based proposal entails removing only a portion of the dam's spillway and abutment along the creek's left (southeast) bank. This option would neither preclude future completion of the dam nor represent an official de-authorization of the Elk Creek facility. Rather, the majority of the federal investment that has been made to date would be preserved and the notching option would not impact the overall structural integrity of the dam (Klatte, 2005).

With Senator Hatfield's retirement in January 1997, local supporters of the dam found a new champion in US Representative Bob Smith (R-OR), a conservative seven-term member whose district included the Elk Creek dam site. As a result, the degree of political receptivity for dramatic change, as utilized by Lowry (2003), would remain rather low. Representative Smith served from 1983-1995, and again from 1997-1999 when he served as Chairman of the Agriculture Committee. During this time, Smith intensely lobbied the Corps to abandon its notch-based plan. His efforts proved successful in March 1998 when ACOE Colonel Robert Slusar assured Smith that his agency would not award a contract to breach Elk Creek Dam in the approaching fiscal year (Buck, 2005).

From a practical standpoint, many of Smith's longtime constituents argued that local growth rates would eventually require more water; flooding would persist without a

completed dam; and agricultural producers would invariably benefit from additional water. Additional, more recent explanations for the continuing support for the dam's completion point to the argument of many local residents that dismantling Elk Creek Dam would threaten their way of life. Consider the statement of one longtime area resident.

"What you have is a very conservative area that believes dams are like the American flag. It's how the West was tamed. People believe that whenever you can get the money, you build one [a dam], and future generations will thank you" – Hunter (1988).

An equally significant impetus for maintaining the dam and continued lobbying for its completion relates to the structure's symbolism. Specifically, many longtime local residents fear, more than anything else, that notching Elk Creek Dam would set a dangerous precedent for the region's thousands of other aging and often-controversial dams (Hunter, 2005). And since national attention has shifted somewhat to the potential breaching of three Corps' dams on the Lower Snake River in Idaho and Washington, construction at Elk Creek of any sort (e.g., completion or breach) was deferred in 1998 due to lack of sufficient funding. For its part, faced with the prospect of being forced to exhaust resources to justify a project it no longer endorses, the ACOE remains to ponder over which direction it will march when the drumbeat of Congress returns to Elk Creek.

In this period of relative policy stasis – and much to the chagrin of environmentalists, federal officials, and the ACOE itself – the unfinished dam continues to cause significant environmental harm in the Rogue River watershed. Perhaps most critically, the dam completely blocks Elk Creek to passive fish migration to roughly fifty-five miles of suitable spawning and rearing habitat; this is particularly troublesome for threatened Coho salmon – listed in 1997, wild summer and winter steelhead, and some

spring and fall Chinook salmon (American Rivers, 2004). In addition, more than fifteen-percent of available salmon habitat in the upper Rogue Basin is blocked by Elk Creek Dam. Together, these ecological indicators would suggest that the costs of maintaining the status quo – and their widespread acceptance within the scientific community – were (and continue to be) readily apparent and high. According to the theoretical perspective offered by Lowry (2003), these factors *should* correlate with the emergence of high magnitudes of policy change.

The same year as the Coho listing, Congress authorized funds for long-term management of the dam in an unfinished state and directed the Corps specifically to take the necessary steps to provide *passive* fish passage through the project (US ACOE, 2006).[29] Thus, the Corps appeared ready to initiate its preferred plan of notching, yet a year later in 1998, implementation was deferred due to a lack of funding.[30] In large part, this prompted a 2000 suit filed by a consortium of environmental and fishing groups against ACOE for alleged violations of the ESA at Elk Creek. In 2001, US NMFS issued its biological opinion stating that any other option besides notching the dam to provide unencumbered passage would most likely result in the extinction of the threatened Coho. The agency also identified adverse effects to Chinook and steelhead and indicated that their future listings were probable (American Rivers, 2004). In response, Congress appropriated $2 million for fiscal year 2002 to facilitate the dam's ultimate notching.

Characteristic of the dam's history, construction of the notch was deferred in January 2002 to allow for review of the Corps' plan. This was followed by the administration's budget request for $1 million to begin implementation of a new, long-term passage solution that *did not* include the notch-based option (Klatte, 2005).

All the while, strong local support for keeping Elk Creek Dam has persisted in many communities throughout Oregon's rural and semi-rural second congressional district. It was thus not too surprising when the majority of the district's constituents selected Greg Walden (R-OR) to succeed Representative Smith in 1999 (Hunter, 2005). Representative Walden has since been a steadfast advocate for keeping and someday finishing the dam. To date, Walden has been reelected to three consecutive terms and in the current 109th Congress, he has been appointed to key leadership assignments in both the Energy and Commerce and Resources Committees.[31] In Chapters 7 and 8, the persistence of this low degree of receptivity to change among coalition members and policymakers remains a defining feature in the Elk Creek case – and of the concomitant paucity of dramatic policy change despite low degrees of dimensionality and highly visible, significant costs of maintaining the status quo.

Conclusion

In the next two Chapters, the political contexts defined by the jurisdictions of the US Bureau of Reclamation and the Federal Energy Regulatory Commission are (respectively) presented in a similar format as the US ACOE. Examination of the individual case studies for each context yields similar political dynamics and episodes of policy stasis. However, in these next two jurisdictional contexts, more definitive and fundamental outcomes have emerged from policy changes in the current of river management and restoration. In Chapter 7, attention returns to the Corps' Elk Creek Dam case, with particular focus on the theoretical framework of Lowry (2003) and the additions proposed in this dissertation.

Notes

[1] The Tennessee Valley Authority (TVA) is a New Deal agency that was created to generate electric power and control floods in a seven-state region around the Tennessee River Valley. President Franklin Delano Roosevelt signed the Tennessee Valley Authority Act creating the TVA on May 18, 1933. TVA's mission is threefold; it provides affordable and reliable power, promotes sustainable economic development, and acts as a steward of the Valley's natural resources (TVA). As of 2006, the TVA power system includes a mix of plants, including three nuclear, eleven fossil fuel, twenty-nine hydroelectric, six combustion-turbine, and one pumped-storage. TVA also has a "green power program", which includes sixteen solar sites and one wind-energy site.

[2] The Animas – LaPlata Project (ALP) was first officially proposed by the Bureau of Reclamation in the 1960's and appropriations were first authorized by Congress in the Colorado River Basin Project Act of 1968. The project, located in southwestern Colorado and northwestern New Mexico, was seen as a way to meet Colorado's water obligations to the Southern Ute and Ute Mountain Tribes, while protecting scarce water resources for other current water users. However, concerns about the environmental impacts of the project have caused numerous delays and severely limited its proposed original size. The original plan was for a depletion of 150,000 acre-feet per year (afy); today's highly revised plan allows a depletion of only 57,000 afy. During the 1980's that the project began to receive considerable attention and despite its controversial status, the Animas-La Plata was given congressional approval in 2000. Construction on the project began in earnest during 2003. The much-revised ALP will involve the construction of a 120,000 acre-foot off-river storage facility reservoir and a pumping system to remove water from the Animas River as it is needed for municipal and industrial users. In addition, a buried pipeline will carry water from Farmington to the Shiprock area to benefit the Navajo Nation. The President's FY 2006 budget request for the ALP is $52 million to achieve the purposes of the Colorado Ute Settlement Act Amendments of 2000. As of early 2005, construction on the project is twenty percent complete.

[3] The Army is one of the three military departments (Army, Navy, and Air Force) that reports to the US Department of Defense

[4] Lt. Gen. Strock holds a BS in civil engineering from the Virginia Military Institute and an MS in civil engineering from Mississippi State University. He is a Registered Professional Engineer.

[5] In addition, a 9th provisional division was activated in January of 2004 to oversee operations in Iraq and Afghanistan.

[6] The seventeen staff offices are: Audit; Civil Works, Contracting; Corporate Information; Counsel; Equal Employment Opportunity; History; Human Resources; Inspector General, Logistics; Military Programs; Public Affairs; Resource Management; Research and Development; Real Estate; Safety and Occupational Health; Security and Law Enforcement.

[7] The history of engineers in the US Army can be traced to the founding of the republic; specifically June 16, 1775, when the Continental Congress organized an army with a chief engineer and two assistants. (US ACOE, 2005). In 1779 Congress created a separate Corps of Engineers, yet by the end of the Revolutionary War, this Corps was mustered out of service.

[8] The measure was approved by Congress on March 1st, 1917 and represents the first federal flood control legislation. It authorized $45 million for flood control work on the two rivers (US ACOE, 2005).

[9] The structural approach to flood control involves an attempt to constrict a river via construction of large embankments. This contrasts the approach grounded in floodplain management, whereby non-structural methods are the primary tool of flood control. Some areas of the flood plain remain undeveloped and are allowed to flood in order to promote the natural capacity of floodplain wetlands to absorb excess water. McCully (1996) argues that this distinction between controlling floods versus managing them dates to arguments between Confucian "contractionsists" who promoted the constriction of rivers between high

embankments, and Taoist "expansionists" who supported the idea of allowing rivers to spread out over their natural floodplains. For additional discussion see Needham, 1971).

[10] Despite this enormous sum that has been spent on flood control, McCully (1996) maintains that when adjusted for inflation, the annual cost of flood damage in the US has more than doubled since 1937, when the first federal Flood Control Act was passed. From 1990-1995 alone, he states that flood-related losses and damage to property were roughly $15 billion. In addition, he maintains that the number of people killed in floods annually has remained about the same.

[11] At the time of planning both Bonneville and Grand Coulee, the engineers and dam builders were indeed well aware of the deleterious effects that the dams would have on migratory native fish species and two different mitigation strategies were proposed (Wilkinson, 1992). The first involved the construction of fish ladders by which the fish migrating upstream could ascend stepwise to the pool behind the dam. The second was applied to dams whose height irreversibly blocked access to (or completely inundated) spawning habitat and focused on replacement of the wild runs via hatchery production. The first strategy was implemented at Bonneville Dam (when finished in 1938). The dam was equipped with a $7.2 million system of fish ladders, locks, traps, elevators, and bypass canals for migrating salmon and steelhead (Wilkinson, 1992). Extraordinarily, however, the original plan prepared by the Corps included absolutely no provision for a fish bypass system. Moreover, the chief Corps engineer purportedly replied to a citizen protest, "we do not intend to play nursemaid to fish" (Wilkinson 1992, 198). This lone remark personifies the larger Promethean agency culture within the Corps during this era, an institutional ethos marked by an unbinding faith in science and technology, optimistic utilitarianism, and what the historian Donald Worster has termed "instrumental reason"(11).

The second mitigation strategy was applied at Grand Coulee Dam, a structure simply too high for fish ladders to be biologically effective (or economically feasible). When the gates were closed in 1941, witnesses reported seeing tens of thousands of Chinook, sockeye, and steelhead circling helplessly in the river below the dam, now cut-off from their ancestral habitat and spawning grounds, after a 600-mile journey from the sea (Wilkinson, 1992). Soon thereafter, an aggressive (and costly) regime of hatcheries, fish screens, and the downstream barging of smolt was launched by the Corps.

[12] Also included were aircraft, tank assembly, and ammunition plants, camps for 5.3 million soldiers, depots, ports, and hospitals.

[13] Prior to this, the Quartermaster Department had built the Army's facilities (US ACOE, 2005a).

[14] The National Rivers and Harbors Congress consisted of local business and political leaders, contractors and industrial interests, key members of Congress (who were 'honorary' members), and ACOE officers (who were 'ex-officio' members) (McCully 1996, 254).

[15] For a discussion on the various definitions of pork barrel politics, see Hird, 1991.

[16] Constitutional questions over the appropriate role of the federal government in flood control and water development were largely settled in 1940 in Supreme Court case, United States v. Appalachian Electric Power Company (Reuss, 2004). In the decision, the Court held that fold control and watershed development were protected under the Commerce Clause of the US Constitution. Regarding large-scale projects for reclamation and irrigation, the Court ruled in the case, United States v. Gerlach Live Stock Co., that such projects also fell under the constitutional provision to provide for the general welfare.

Perhaps more significant, many ACOE personnel have expressed technical concerns over multipurpose dams and water projects. There continues to exist debate over how to best operate a reservoir to simultaneously meet hydropower needs (which requires a relatively full reservoir to meet release requirements during periods of high demand) and those related to flood control (which often require that the reservoir be mostly empty to accommodate upstream floodwater.

[17] With this announcement, Carter actually reinstated funding for three ACOE projects that were on the original hit list and a month later, Carter issued a revised list of twenty-nine projects, yet full funding was restored to five more ACOE projects and two received partial re-funding. However, eleven of the remaining fourteen projects built by the ACOE remained slated for termination.

[18] The EL's staff supports the environmental missions of the U.S. Army, the Department of Defense, and the Nation through research, development, special studies, and technology transfer.

[19] Testimony of Major General F. P. Koisch, Hearings on Stream Channelization Before the House Committee on Government Operations, 92nd Congress, 1st Session, Part 2, at 556, 580 (1971).

[20] Regarding the decisionmaking and environmental practices of the remaining federal agencies, Mazmanian and Nienaber (1979) found that little had changed. Thus, they described the ACOE as the apparent exception.

[21] For its part and in response to the Corps, the Bureau was attempting to secure funding for a single-purpose flood-control dam in the southeastern US by the late-1960s.

[22] In 2001 Rep. Tom Tancredo (R) CO – introduced The Army Corps of Engineers Reform and Community Relations Improvement Act. It would have require the Corps to report to Congress on all federally owned lands under the jurisdiction of the Corps, which of those lands are no longer needed and in the federal interest. In addition, it would have required the Corps to recommend a plan regarding cost-sharing for rehabilitation, modification, operation, and maintenance of recreation facilities at Corps projects leased by states and localities for recreational use. This cost-sharing proposal was endorsed by the Western Governor's Association in 1999, including then-Governor George W. Bush.

[23] For example see the following: 107th Congress – H.R.. 2353, S. 1987, S. 3036, S. 2963; 108th Congress – S. 2188.

[24] According to Clarke and McCool (1996), the Corps has been diligent in its enforcement of the 404 program. For example, a 1993 review by the GAO of 'takings cases' filed against the government found that the most common complaint was that the Corps refused to grant a permit for the filling of a wetland.

[25] For a discussion of these, see The National Journal (April 2, 1988): 868-872.

[26] An omnibus spending bill is a bill that sets the budget of many departments of the United States government at once. Ordinarily, individual bills are passed separately in distinct policy domains (e.g., one bill for Defense, one for agriculture, one for education, etc. Yet when Congress does not or cannot produce separate bills in a timely fashion (by the beginning of the fiscal year on October 1), it may roll many of the separate appropriations bills into one omnibus spending bill. Omnibus spending bills are frequently criticized for being laden with pork and commonly exceed 1,000 pages. Oftentimes the bills have not read in full by the people voting for them. Nevertheless, they have grown more common in recent years.

[27] Lost Creek Dam was renamed by Congress in 1996 in honor of William L. Jess, one of the founders of the Rogue Basin Association in 1955. Jess was a strong advocate for the construction and multiple-use of the impounded waters.

[28] Carter entered the White House during a period when the cumulative federal debt was nearly $1 trillion and inflation had already reached the double digits, yet all the while federal water bureaucracies were spending roughly $5 billion per year (Reisner, 1993). In response, Carter entered office with the intent of streamlining the federal budget by taking on the water establishment in Congress.

[29] Funds appropriated in the Energy and Water Development Appropriations Act for fiscal year 1997.

[30] The notch through the dam would have been about 150-feet wide at the dam's base and 225-feet wide at the top. This size was designed to meet fish passage velocity criteria at a flow range of between 10 – 5,000 cfs. This range of flows was coordinated with and recommended by state and federal fishery resource agencies (ACOE, 2006).

[31] During the 107th Congress, Rep. Walden was one of only two sophomores to receive a spot on the influential Energy and Commerce Committee, which has broad jurisdiction over a range of departments and issues including health care, energy, transportation, trade, telecommunications and commerce. Currently he is Chair of the Subcommittee on Forests and Forest Health.

CHAPTER 5

"Thanks to irrigation, thanks to the Bureau – an agency few people know – states such as California, Arizona, and Idaho became populous and wealthy; millions settled in regions where nature, left alone, would have countenanced thousands at best; great valleys and hemispherical basins metamorphosed from desert blond to semitropic green" – Reisner 1993, 2.

Introduction

This chapter presents a broad overview of the US Bureau of Reclamation. It begins with a brief discussion of the agency today, in terms of its organization, activities, and mission. The second section describes motives behind the Reclamation movement and offers a brief organizational history of the Bureau. What began as a Progressive-era movement to promote settlement of small-scale farmers in the American West through federally-subsidized projects and irrigation water was soon beset with financial and logistical problems. Despite Congressional assistance, it wasn't until the Great Depression that Reclamation was saved.

As the nation literally built its way to economic recovery, the Bureau quickly rose in national prominence and power. Assisted by Congressional support and a series of powerful Commissioners, the agency embarked on an unprecedented construction spree in every river basin of the American West. Naturally this engendered competition with the ACOE and before long; criticisms followed from fiscally-conservative politicians and the burgeoning environmental movement. The third section discusses how the agency has been impacted by the modern environmental movement and responded to mandates that it mitigate an array of ecological damages caused by existing projects. This involves an ongoing effort by the Bureau to reinvent itself and attempt to become a more diverse federal agency. The final section of the chapter considers the ongoing changes, both

procedurally and substantively, within the Bureau and speculates on its activities in the areas of environmental restoration and dam removal. Specific attention is given to recent Bureau Commissioners and the agency's environmental activities in the Pacific Northwest region. In conclusion, the current debate on whether to remove the Savage Rapids Dam, situated on the mainstem of southern Oregon's Rogue River, is described in the political and jurisdictional context of the BOR.

I. US Bureau of Reclamation

The Bureau Today

The contemporary Bureau is the nation's largest wholesaler of water. Its dams, reservoirs, and canals, deliver over ten trillion gallons of water each year to more than thirty-one million people in seventeen western states.[1] The agency also provides roughly twenty-five percent of all Western farmers (140,000) with irrigation water for use on over ten million acres of farmland that produce nearly sixty percent of the nation's vegetables and twenty-five percent of its fruits and nuts (US BOR, 2005).

The Bureau is guided by the (current) stated mission to "manage, develop, and protect water and related resources in an environmentally and economically sound manner" (US BOR, 2005).[2] Balancing such tasks has at times proven difficult for the BOR; with the unprecedented population growth and economic development that has taken root during the past century in the mostly-arid American West. This combination of burgeoning water demands and climatic limitations prompted the Bureau to construct many of the region's most ambitious water storage and delivery projects during the latter two-thirds of the twentieth century.[3] As 'good' dam and reservoir sites have become more scarce (and environmental regulations more prominent), the continued pressure to

deliver greater quantities of water from arid landscapes has compelled the modern Bureau to pursue strategies to increase efficiency, in order to satisfy multiple competing entities (e.g., irrigators, municipalities, industries, recreational interests and environmental mandates). This diverse constituency of water users has obliged the agency to work in partnership with states, tribes, water users, and other federal agencies to seek workable solutions to water issues and supply demands (US BOR, 2005).

In addition to its water delivery operations, Reclamation is the second largest producer of hydroelectric power in the western US. Although power was not listed as an objective in the 1902 Act, the generation of hydroelectricity had become a critical feature of water resources development by 1939 (Clarke and McCool, 1996). Today, the Bureau's fifty-eight hydroelectric plants provide more than forty billion kilowatt hours annually, which generate nearly a billion dollars in power revenues and produce electricity to serve roughly six million homes (US BOR, 2005). And behind the Bureau's hydroelectric facilities rest 348 reservoirs and 308 recreation sites, which the agency manages in partnership with other federal and state agencies for an estimated ninety million annual visitors (US BOR, 2005).

Organizationally, the contemporary BOR is housed within the US Department of Interior and its operations are managed by a Commissioner who is under the direction of the Secretary of the Interior. Currently, John W. Keys III is the Bureau's sixteenth Commissioner.[4] The BOR is organized around fifteen programmatic offices located in Washington, DC and Denver, CO. In addition, there exist five sub-regions within the seventeen western states in which the Bureau's environmental programs are

headquartered. Structured on the basis of river basin, these include the Pacific Northwest; Mid Pacific; Lower Colorado; Upper Colorado; and Great Plains. [5]

Contemporary Environmental Programs of the Bureau

In their account of the organizational trajectory of the BOR, Clarke and McCool (1996) acknowledge that the agency has in fact responded to environmental challenges; albeit delayed by nearly two decades. In a related account, Espeland (1998) highlights the lasting effects of the post-NEPA "New Guard" on the agency's ongoing operations; although she admits this group is less salient at the BOR than it once was. Regardless, annual budget requests from today's Bureau regularly involve environmental projects. In addition, there exist "conservation centers" within every BOR regional office.

However, bona fide attempts of BOR to shift its focus from project construction to innovative and efficient water resources management and/or to transform itself from a civil works agency into a water management and distribution agency have not fully materialized. Thus it remains unclear whether the Bureau can "reinvent" itself as a resource management and restoration agency in light of the changes that have occurred in the larger sociopolitical environment. According to Lowry (2004), the Bureau took a symbolic step in this direction by changing the names of its conference rooms in the Denver office from dams to rivers.

Considering the organization as a whole, the Resource Management and Planning Group (RMPG) – housed within the Bureau's Office of Policy – is primarily responsible for the agency's environmental programs. This involves the coordination of multi-agency water resource planning and ensuring baseline NEPA and ESA compliance – in addition to hazardous materials cleanup and recreation and interpretive plans (US BOR,

2005f). In doing so, the RMPG serves as the Bureau's Technical Service Center and provides multidisciplinary expertise in the following areas: planning, recreation, cultural resources, multidisciplinary team management, public involvement, environmental compliance, conflict resolution, social analysis, and facilitation (US BOR, 2005f).

Environmental Activities in the Pacific Northwest

Of particular interest to this dissertation is the Bureau's Pacific Northwest Region (PNR), which includes the major river basins in Washington, Idaho, Oregon (and small areas of western Montana and Wyoming and northern Nevada). In the PNR, water used for irrigation and power generation is supplied from fifty-four reservoirs with a total active capacity of approximately 18 million acre feet (US BOR, 2005g). The PNR is also home to a number of anadromous fish recovery programs in which the Bureau's activities include cooperative watershed planning and the design and installation of fish passage devices (US BOR, 2005g). To further mitigate damage to these species and their critical habitats, regional BOR staff is required to regularly consult with the NOAA Fisheries and the US Fish and Wildlife Service.

As an agency within the US Department of the Interior, the Bureau must comply with the ESA in the operation, maintenance, and rehabilitation of its projects and facilities. Specifically, there is an ESA component for the planning and implementation activities in these areas. In an attempt to avoid additional listings, the Bureau is also mandated to consider its impact on candidate species (e.g., those not currently listed, but information exists that may warrant their future listing). As such, ESA-compliance is incorporated into the Bureau's NEPA-processes (US BOR, 2005g).

Bureau staffers in the PNR region also work in concert with the Northwest Power Planning Council's "Strategy for Salmon", through which the BOR collaborates with state and local interests in water conservation demonstration projects and model watershed programs in Oregon, Washington, and Idaho. By extension, in attempts to promote a balance among resource development, recreation, and protection of natural and cultural resources for the lands and waters it manages, the Bureau is also required to complete so-called Resource Management Plans (RMP). These serve to outline policies and actions for the Bureau (and other managing agencies and the public) that are implemented over ten-year intervals (US BOR, 2005g).

II. A Brief History of Reclamation

"The Bureau of Reclamation, created by the Reclamation Act of 1902, was an organizational expression of America's westward movement" – Clarke and McCool 1986, 129.

As settlement in the western US unfolded throughout the nineteenth century, so too did the recognition that large-scale water development would be necessary in order to sustain socioeconomic development in the mostly arid region; where average annual rainfall is less than twenty inches ((DeVoto, 1942). In addition to its natural aridity, the region's surface water sources are scattered widely across vast landscapes and when located, rivers often flow vigorously through parched landscapes and inaccessible canyons. The few major rivers in the region are known to exhibit tremendous natural flow variations depending on season and dynamic weather patterns. And when seasonal precipitation falls in the West, it is often sudden and overwhelming, yet sporadic.

These features combine and produce a hydrologic landscape that would have been utterly new and distressing to early settlers as they moved farther West. In order to

harness such a tempestuous resource, it quickly became apparent to those striving to settle and sustain development in the West that unprecedented measures were necessary. Contrary to what had transpired in the more humid eastern US, the promotion of growth and expanded water development in the West would assume a much grander scale, cost, and unprecedented government involvement (Worster, 1985).

Reclamation Act

In July of 1902, in accordance with the Reclamation Act, Secretary of the Interior E.A. Hitchcock established the United States Reclamation Service (RS) within the United States Geological Survey (USGS). And while it was Francis G. Newlands, congressman from Nevada, whose name was attached to the [Newlands] Reclamation Act of 1902, it was Theodore Roosevelt – president for less than a year after McKinley's assassination – that convinced a skeptical Congress that western reclamation made sense (Martin, 1999).

According to Worster (1985), the 1902 Act represents "the most important single piece of legislation in the history of the West" (130). Initial funding was provided by Congress for the new Service to engage in the "storage, diversion, and development of water for the reclamation of arid and semiarid lands" in the western US (Reclamation Act, 1902). Of specific focus were the sixteen western states which contained Federal land. Because Texas had no such land, it did not become an RS state until 1906 when Congressional action provided for its inclusion in the provisions of the original Reclamation Act (US BOR, 2005).

The early reclamation movement was driven by a utilitarian ethos with a focus on efficiency and equity. In part, this was a product of the dominant worldview of the time; conservationism (as a component of Progressivism) (Clarke and McCool, 1996). Quite

simply, there were untapped resources in the American West that, if not developed (via large-scale, government action), would invariably go to "waste" or be exploited by private interests. Leading conservationists of the time, including President Theodore Roosevelt, were driven by the perception that water in the West was "wasted" if allowed to flow unencumbered (and ill-utilized) to the ocean. As such, reclamation was promoted as the means to achieve the following utilitarian goals; it would make fallow (arid) lands productive, prevent monopolies (due to the initial 160 acre limit of project beneficiaries), and democratize the West by populating it with the Jeffersonian ideal of agrarian communities (Wilkinson, 1992).[6] Indeed, the organic mission of the BOR was intimately linked to irrigation. According to President Roosevelt's State of the Union address in December 1901,

"The western half of the United States would sustain a population greater than that of our whole country today if the waters that now run to waste were saved and used for irrigation" (Reisner 1993, 112).

This early conservation movement in America exhibited a number of paradoxes, perhaps none more apparent than the desire to protect imperiled resources while unquestioningly accepting the necessity of large-scale irrigation. Perhaps the most spirited proponent of irrigation during the incipient years of American conservationism was W.E. Smythe. His infamous 1900 text, entitled *The Conquest of Arid America*, predicated the ideals of democracy, patriotism, economic ambition, technological optimism, and utopianism on the advancement of the reclamation movement. In presenting the case for the technological domination and transformation of nature in the arid West, Smythe and fellow early conservationists such as Theodore Roosevelt claimed that irrigation had the potential to affect nothing less than the fulfillment of America's

destiny (Martin, 1999). Massive irrigation was seen as an incomparable instrument of democratic prosperity that would confer benefits on each western state and on the life of the nation as a whole.

In a related manner, reclamation was pursued with lofty and often romantic motives. According to Reisner (1993),

"... the psychic value of Reclamation [projects] has always been high. The only relief in a pitiless desert landscape, their worth was computed in almost ethereal terms, as if they were art" (117).

The damming and redirection of desert rivers onto the fields of settlers was also seen as a spiritual duty, intended to further God's work by turning the wilderness into a garden (McCully, 1996). With a religious-like fervor, the 1902 Act and the reclamation movement were promoted as the means to reclaim the divine order of nature by restoring the arid lands of the West to their original Edenic state. Central to this proposal was the ambitious goal to, quite literally, make the desert bloom. According to Reisner (1993),

"The engineers who staffed the Reclamation Service tended to view themselves as a godlike class performing hydrological miracles for grateful simpletons who were content to sit in the desert and raise fruit" (Reisner 1993, 114).

In 1907, the Reclamation Service was moved from the USGS and reestablished as an independent agency within the Interior Department. Another organizational change occurred in 1923 when the Secretary of the Interior created the position of Commissioner of Reclamation and renamed the Service the Bureau of Reclamation.

Traditional Reclamation Worldview

From its inception, the Bureau has been an agency comprised of engineers, guided in large part by a Promethean ethos. According to Dryzek (1997), the Promethean or cornucopian position views all growth as good and ignores concerns over the finite

supply of natural resources. As such, adherents to this perspective have exhibited an unlimited confidence in the ability of science and technology to overcome any environmental dilemma or resource shortage. According to Espeland (1998), this traditional ethos of the Bureau is rooted in frontier narratives and Progressive ideals; and defined by a celebration of humanity's "rational" mastery over nature. Consequently, Bureau personnel have long-since been instilled with a desire to *impose* their projects on the natural world in the pursuit of technical solutions to social problems. Clearly, the construction of a plethora of ambitiously extensive projects throughout the 1940s, 50s, and early 1960s represented appropriate means through which to exercise these attributes.

Similarly, the original worldview of the BOR was galvanized and utterly symbolized by completion of the unprecedented Hoover Dam in 1935. The efficiency with which the dam was constructed ushered in the heyday of the agency's huge and expensive projects, as the dam vindicated and legitimated Reclamation's engineering status and its promotion of irrigation as the medium for social reform – water was seen as the social equalizer (Espeland 1998). In the process, the BOR sought to democratize the West, alleviate overcrowding in the cities, and promote the agrarian ideal via its techno-optimism and "engineering Progressivism", in which the technical elite took the lead in making public policy (Espeland, 1998). This explains why engineers rose quickly to dominate the agency; a phenomenon discussed by Clark and McCool (1996) as involving a strong esprit de corps.

The 1902 Act stated that income from the sale of public lands that would receive water from new developments in the seventeen western states (as provided for by the 1862 Homestead Act) would compose the reclamation fund held in the U.S. Treasury.[7]

This fund would initially finance the federal construction of water diversion and storage projects; the costs of which would then be repaid by water users over time. These water users were a product of the 1862 Act, which permitted heads of families to acquire up to 160 acres of public land to cultivate for a nominal fee. And from that point on, homesteaders who came West soon became familiar with one overriding reality of the region; "Land in the West was virtually useless without water" (Clarke and McCool 1996, 130).

Reimbursing the Reclamation Fund

Many studies have documented the extent to which the proposed repayment scheme was beset with problems from its inception (e.g., Worster, 1985; Wilkinson, 1992; Reisner, 1993; McCully, 1996; Clarke and McCool, 1996; Martin, 1999). In the words of Worster (1985) the federal reclamation program was "hopelessly unrealistic, expensive, unworkable, and naïve" (130).

First and foremost, the 1902 Act limited the Service to construct projects in a handful of western states. As such, the scope of its potential operations was geographically constrained from the outset. By extension, this limited the source of project funding to the sale of public lands in seventeen states.

Inevitably, the reclamation fund was soon diminished and the sale of public lands and subsidized water were insufficient to cover the costs of new projects. In an effort to sustain the program, the repayment schedules for water users were continually extended by Congress. In addition, farmers were exempted by law from paying interest on virtually all of their repayment obligations. According to Reisner (1993), such a subsidy was substantial to begin with and during subsequent decades, it became incredibly

generous as interest rates exceeded ten percent.[8] Roughly thirty years after the reclamation fund was established, it was common for BOR project beneficiaries to make repayments by means of forty-year, no-interest loans (Wilkinson, 1992).

Another problem inherent to the initial repayment scheme related to the original 160 acre limit on the parcels of public domain allotted to homesteaders.[9] In particular, the 1902 Act provided any homesteader up to 160 acres of land without regard to its location across the vast western US. As such, settlers in the Mediterranean climates of many California areas could flourish and become wealthy on 160 acres dedicated to lemons or other high value crops, while those who settled on the interior steppes of Wyoming or Montana were likely to starve on irrigated plots of comparable size (Wilkinson, 1992). Indeed, scores settled in inhospitable regions were only marginal yields of low-value crops were possible. Other dry, grassland areas were only suitable for livestock grazing and the 160 acre plots were woefully undersized and incapable of supporting enough animals to yield any type of surplus or profit.

These problems were compounded by the fact that few homesteaders had adequate experience with irrigation farming and the dynamically arid landscapes they settled. Oftentimes their crop lands were mismanaged and many filed claims on plots that required more irrigation than could be provided and/or afforded. When settlers were able to aggressively irrigate their marginal lands, repayment obligations in excess of what could be provided by the farmers were often the result. Many were forced to leave their plots fallow and eventually file for bankruptcy.

Roughly twenty years after the Reclamation Fund was initiated, only ten percent of the money it had loaned had been repaid and nearly sixty percent of the irrigators were

defaulting on repayment obligations (Martin, 1999). Such conditions prompted a number of initial reforms.[10] In 1910 the Bureau received a $10 million loan from the Treasury Department in order to simply keep the agency in business. Subsequent reforms required Reclamation projects to have explicit approval from the President prior to their construction. However, such measures had little impact on the ground and despite the persistence of failures within the reclamation movement; the attractiveness of cheap public water remained high. Accordingly,

"Every Senator still wanted a project in his state; Every Congressman wanted one in his district; they didn't care whether they made economic sense or not" (Reisner, 116).

Reclamation projects have always been highly coveted by members of Congress and the BOR was soon to begin a building spree. By 1924, twenty-seven projects were completed or under construction and all but six of these had been initiated before the Bureau was even half a decade old (Reisner, 1993). In large part, the continued authorization of BOR projects in lieu of significant repayments was encouraged by Congress. For example, lawmakers extended the repayment period from ten to twenty years in 1914 and by 1924; it had been extended to forty. In 1939, Congress passed the Reclamation Project Act which allowed irrigators to repay reimbursable costs only up to their "ability to pay" (Wilkinson, 1992). Despite such measures, repayments continued to lag behind and to this day, huge amounts remain unpaid in many of the larger irrigation districts (Wahl, 1989).[11] By 1930, Worster (1985) portrays the federal reclamation program as the following.

[It was] "so manifest a failure that, had there not been powerful groups and strong cultural imperatives supporting it, would have died an ignominious death" (130).

Beyond 160 Acres and the Emergence of Corporate Farming

Within only a few years of the passage of the 1902 Act, it had become increasingly clear that the 160 acre limit for individual farmers in reclamation projects had serious problems and that the Bureau's (subsidized) irrigation was no more economically viable than irrigation efforts by private entities (e.g., Mormon settlers in Utah) (McCully, 1996). In another sense, corporate farming interests (notably those in California) opposed the acreage limitation on grounds that their production would be limited if reclamation water would be made available in the future. Together, these concerns explain why it became commonplace for the Bureau to overlook the acreage requirement. The BOR also allowed the practice of leasing, whereby a single corporation could control large blocks of irrigated land via leases with individuals owning 160 acre plots. In fact, the Bureau's cloudy interpretation of the Act was critical to the eventual settling of the drawn out controversy over construction of California's Central Valley project.[12] According to Worster (1985) the agency acquiesced to the Imperial Valley's demand that it not ask Congress for clarification of the Act; thus demonstrating that "[it] was more eager to construct dams than to insist on a rigorous enforcement of the law" (243).

In addition, the Act allowed adults to homestead on public land and receive Reclamation water on behalf of their children. This made possible multiple ownerships within a single family (even by minors), where the family could in effect operate areas of irrigated land that greatly exceeded the acreage limitation. Furthermore, a family could choose to lease all or a portion of such an enlarged irrigation block to land speculators or other development interests. Together, these potential loopholes in the 1902 Act gave the newly available (and cheap and publicly subsidized) Reclamation water a lure that caught

the eye of corporate farming interests and other speculators, especially in the most profitable agricultural areas (Wilkinson, 1992).[13]

Exploitation of these and other loopholes promoted the development of monopolistic agribusiness ventures across the West; an occurrence which has led many to suggest both the letter and spirit of the 1902 Reclamation Act have been routinely and widely abused (e.g., Worster, 1985; Wilkinson, 1992; Reisner, 1993). Indeed, many of today's beneficiaries of Reclamation water bear little resemblance to Jefferson's yeoman and agrarian ideal. In a short time, an emergent group of large-scale agribusiness and municipal interests would replace the homesteaders, sodbusters, and small-scale farmers for whom reclamation was initially intended.[14]

Transition: Persistent Failure, Change, and the Colorado River Compact

As the preceding section described, the reclamation movement encountered a host of problems in its inaugural two-and-a-half decades. Regarding early projects, many serviced lands and soils that were unsuitable for irrigation; many were built in areas that could only grow low-value crops; and many led to the water-logging of irrigable lands, which then required expensive drainage projects (US BOR, 2005). In addition, settlers were inexperienced in irrigation farming; water users often failed to meet proposed repayment schedules; and loopholes in the 1902 Act provided speculators and corporate farming interests the opportunity to capitalize on publicly subsidized water.

In response to an overall increase in unrest among settlers, Congress issued the "Fact Finder's Report" in 1924 (US BOR, 2005). The Report sought to resolve many of the financial problems of the BOR and prompted Congressional passage of an act in 1924; section 4 of which came to be known as the Fact Finders' Act (43 Stat. 701). The result

was a series of major adjustments to the basic Reclamation program which worked to satisfy settler unrest. Most significantly, the 1924 Act facilitated the Boulder Canyon Project, construction of Hoover Dam, and ratification of the Colorado River Compact (Lamb, 2004). [15]

Negotiations had begun over the Colorado River Compact in early 1922 under the guidance of then Commerce Secretary, Herbert Hoover. The Compact was drafted as an interstate compact of mass water allocation among seven states in the Colorado River basin. The agreement divided this region into two areas; the Upper Basin (representing the states of CO, NM, UT, and WY) and the Lower Basin (NV, AZ, and CA). Each was allotted 7.5 million acre-feet of water and the states were required to divide their basin's allotment among themselves – a stipulation that would lead to protracted conflict among states such as California and Arizona.

By 1928 six of the seven states had ratified the Compact which led Congress to authorize the BOR to begin construction on Boulder Dam and the All-American Canal to deliver irrigation water to southern California.[16] Initial appropriations came in July of 1930, by which time Herbert Hoover had become president. Construction on the dam that would ultimately carry his name began in 1931 and was completed in 1936; more than two years ahead of schedule.[17]

The project produced the largest dam, power plant, and reservoir on earth (Kollgaard and Chadwick, 1988). [18] At the time, it was clearly the most ambitious engineering enterprise undertaken anywhere on the planet and by many accounts, it remains the most significant structure ever engineered and built in the US (Reisner, 1993; Kollgaard and Chadwick, 1988; Martin, 1999). The 726 foot-high structure had cost $49

million to construct ($676 million as adjusted for inflation) and quickly became one of the top engineering marvels on earth; symbolizing America's spirit, ingenuity, and technical prowess. In response to viewing the dam, Wallace Stegner wrote in 1946,

> "It's certainly one of the world's wonders, that sweeping cliff of concrete, those impetuous elevators, the labyrinth of tunnels, the huge power station. Everything about the dam is marked by the immense smooth efficient beauty that seems peculiarly American" (IDSN, 2005).

In a larger context, two related events have been pinned to the Bureau's rapid ascendancy and its short-lived heyday during the middle part of the twentieth century; the Great Depression and election of Franklin D. Roosevelt in 1932 (Richardson, 1973; Clarke and McCool, 1996; Reisner, 1993; Lamb, 2004). When FDR assumed the Presidency in 1933, nearly twenty-five percent of the population was without viable means of employment. In order to address such a drastic condition, the newly-elected President turned to the construction of public works; including bridges, highways, reservoirs, and dams (Reisner, 1993).

The Great Depression and Public Works

The successful construction of Hoover Dam during the heart of the Depression seemingly defied odds, as the largest structure on earth was completed ahead of schedule during the worst economic crisis in American history. The patriotism and ambitious optimism this instilled would guide Roosevelt's plan for recovery. In effect, a potent combination of widespread unemployment, apprehensions over how this might impact domestic politics and security, and unprecedented government intervention would lead the nation to literally construct itself out of depression.

Harold Ickes was largely responsible for implementing Roosevelt's public works-based recovery program. In addition to being Secretary of the Interior, whereby Ickes

controlled not only the BOR, but the Civilian Conservation Corps (CCC) and National Park Service (NPS), he was also in charge of the Public Works Administration (PWA) (Reisner, 1993).[19] During the five-term interregnum of Roosevelt and Truman, the CCC, PWA, and BOR would provide construction jobs for the millions of skilled workers that had lost their jobs during the Depression years. According to Worster (1985), as the Bureau exploited the depression-era conditions of the 1930s, it began to redefine its niche in the political landscape. In short time, the Bureau would become part of the emerging agribusiness vineyards and orchards of the West Coast. The end result would be not only an unprecedented increase in federal largesse, but the construction of a dizzying array of public works projects.

For its part, the BOR experienced tremendous growth during this time. Its number of employees exploded from roughly 2,500 under the Hoover administration to nearly 20,000 by the time Truman succeeded Roosevelt (US BOR, 2005). In addition to its sheer size, the Bureau changed in terms of its organizational structure and character (Clarke and McCool, 1996). Regarding the former, the nearly 20,000 Bureau employees were spread across new field and project offices across the West. The greatest percentage however was concentrated at the Bureau's regional headquarters in Denver. In addition, the vast majority of this new workforce was involved in either the planning or supervision of BOR projects, or the search for new construction opportunities. In contrast to traditional operations, most of the actual construction duties in this new era of reclamation were contracted out to a consortium of large-scale engineering firms.[20]

In terms of its approach and method of operation, the BOR had also changed. Traditionally it functioned as a strict engineering agency, and its Commissioners tended

to be somewhat modest in their ambitions (Reisner, 1993). Beginning with Ickes however, BOR Commissioners would (often by necessity) adopt the role of ideologue and salesman (Reisner, 1993). As such in the new reclamation era, the role of Commissioner would come to focus on public relations and the development of campaigns to secure new projects.

Even after the completion of Hoover Dam, the BOR was active in overseeing the construction of the Shasta and Friant dams on California's Sacramento and San Joaquin Rivers (respectively), and the massive Grand Coulee Dam on the Columbia River in the Pacific Northwest[21]. In addition, Reclamation officially assumed control over California's Central Valley Project in 1935 which together with the preceding dams, came to represent the largest public works project in the world (McCully, 1996). By the end of the decade, Congress had authorized the development and construction of nearly 40 Reclamation projects.

Public support for the government's role in promoting reclamation continued from the Depression into the Dust Bowl years and ultimately, into the World War II-era (Lamb, 2005). In fact, most of the Bureau's largest program was authorized during this time, as twenty-nine of the 33 units and/or divisions of the Pick-Sloan Missouri Basin Program were authorized with passage of the Flood Control Acts in 1944 and 1946 (McCully, 1996). In addition, BOR construction on the Colorado-Big Thompson Project (C-BT) was authorized by Congress in 1937. Less than a year later, the Bureau had begun construction of the C-BT project on both sides of the Continental Divide in Colorado.

As the US prepared to enter WW II, the advancement of hydropower generating capacities at large dam sites across the West became critical elements of the military buildup and in particular, the production of aluminum. For the Bureau, its dams were of particular importance. In fact, by the end of the War, the Hoover, Shasta and Grand Coulee dams represented the second, third, and fourth (respectively) largest single sources of electricity in the world (McCully, 1996). The only larger single source of power in the world was the ACOE's Bonneville Dam on main-stem of the Columbia River. According to Reisner (1993),

"No one knows exactly how many planes and ships were manufactured with Bonneville and Grand Coulee electricity, but it's safe to say that the war would have been seriously prolonged at the least without the dams" (162).

And not only did the region's hydroelectric production make possible the boom in America's aluminum production that was critical for plane- and shipbuilding; there was enough power to pursue development of plutonium-239 at the nuclear weapons facility on the Hanford Reservation, located along the bank of the Columbia.[22]

River-Basin Accounting and Planning

"Between Roosevelt and the river-basin approach – which in an instant, could authorize dams and canals and irrigation projects from headwater to river mouth, across a thousand miles of terrain – the natural landscape of the American West, the rivers and deserts and wetlands and canyons, was to undergo a man-mad transformation the likes of which no desert civilization has ever seen" – Reisner 1993, 119.

BOR dams such as Grand Coulee and Hoover (and eventually Glen Canyon) quickly came to be seen as 'cash register' dams, from which the sale of electric power was used to offset the costs of pumping and delivering irrigation water in other areas. These dams were used widely by the Bureau to subsidize many of its unprofitable irrigation projects. This practice gave rise to the concept of river basin accounting,

whereby the BOR would lump all its water development revenues from a watershed or river basin into a common pool. This method of aggregate accounting had the effect of blurring the distinction between money-losing (usually irrigation projects) and money-making (usually hydroelectric) Reclamation ventures (CPLUHNA, 2005). From this broad, river basin perspective, many of the economic deficiencies of BOR projects were less clear and as a result, many projects of questionable design and economic rationale were authorized under the precepts of river basin planning. For most BOR projects in fact, a dam's hydroelectric features were necessary to compensate for the financial losses of the irrigation projects (Reisner, 1993).

A related aspect to river basin planning came to involve extensive planning schemes whereby entire river basins were targeted for comprehensive, multipurpose development. The 1928 passage of the Boulder Canyon Project Act initiated this type of multipurpose planning. For the first time, Congress had committed a federal bureau (e.g., Reclamation) to construct and operate a large dam that was to serve a variety of purposes (White, 1950). Reisner (1993) argues that a series of subsequent omnibus river basin bills passed during the Roosevelt and Truman years worked to dramatically accelerate this trend.[23] In addition, President Truman's Water Resources Policy Commission clearly emphasized the necessity for basin-wide, multiple-purpose resource planning (Garnsey, 1952).[24]

In 1937, the Central Valley Project (CVP) was authorized and upon completion; it would represent the most expansive project in BOR history – even though it would be undertaken entirely within the borders of a single state (Worster, 1985).[25] The main purpose of the CVP was to provide for transportation of the abundant water supplies of

the northern end of the Central Valley to the dry, southern end for irrigation. As a multipurpose project, it was also intended to promote development of urban water supplies, provide flood protection, and produce the hydropower necessary to operate the entire Sacramento River project (US BOR, 2005a).

In the Columbia River basin, a succession of multipurpose Reclamation (and ACOE) projects transformed the once-mighty river into a near-reservoir from the Canadian border and Grand Coulee Dam, to the river's mouth near Portland, OR and the Corps' Bonneville Dam.[26] Throughout the basin and the Pacific Northwest region, Reclamation would build a series of dams and diversion projects which, individually, were constructed and operated to serve a multitude of purposes; most notably hydropower generation and water storage for irrigation.

Similar to such activities on the Columbia, the Bureau pursued basin-wide, multipurpose water planning throughout the Missouri River drainage. However due to its eastern location where the ACOE had traditionally reined supreme, the BOR's proposed development on the Missouri would engender significant conflict.[27] And while the Corps had clearly established itself in the Northwest and parts of California, the Bureau's movement to the East set the stage for largest battle between the two agencies (Reisner, 1993). Indeed, the Bureau's ambition to pursue a series of irrigation and flood control projects would lead to the highest levels of competition and animosity to have ever transpired between the two primary federal water development agencies; conflict that was even greater than what had previously transpired in California's Central Valley (Wilkinson, 1992; Reisner, 1993).

For its part, the Bureau would construct nearly forty dams that would form twenty-six major reservoirs, as well as scores of smaller diversion and water delivery projects in the Missouri River Basin.[28] These BOR projects would come to provide a host of interrelated services; including flood control, assistance to navigation, irrigation for over 3 million acres of land, supplemental water supplies to nearly 700,000 acres of land, power generation from plants with a total installed capacity of about 2.5 million kilowatts, and municipal and industrial water supplies (US BOR 2005b).

Perhaps no other single river exemplifies the Bureau's comprehensive, multipurpose river planning ambitions than the Colorado. As a result, it remains the most legislated, litigated, and plumbed river on the continent (Reisner, 1993). Consider the following. On the Colorado, the Bureau's construction of Hoover Dam ignited the movement to promote comprehensive water development that would eventually reach throughout the basin. Hoover, and subsequently Glen Canyon Dam (finished in 1963) were constructed as the primary storage mechanisms for implementation of the 1922 Compact and together, they store nearly fours years' of the river's flow (Wilkinson, 1992). A series of other major dams and reservoirs were constructed along the course of the lower Colorado to satisfy demands from southern California's Imperial Valley and urban centers. In later decades, these same projects were used to meet contractual obligations for water delivery hundreds of miles to the east in Arizona's interior.[29] In addition, Colorado River water is now transported by the BOR hundreds of miles east of the continental divide to Albuquerque, NM through a complex series of dams and massive canal and pipeline systems known as the San Juan – Chama Project.

Congress, Pork, and Dams

"In the Congress, water projects are a kind of currency, like wampum, and water development itself is a kind of religion" – Reisner 1993, 308-309.

As the commercial interests profiting from the various services provided by BOR projects steadily increased, so too did the number and strength of professional organizations lobbying for their construction. Initial support came from private landlords and the farming, grazing, and mining industries. Together with these traditional constituencies, agribusiness interests and municipal water supply companies would combine into a powerful force in the lobbying of elected officials for funding and continued water development (Reisner, 1993).[30] And in the US Congress, the time-honored practice of *quid pro quo* politics would quickly take root in this domain as members jostled to secure federal funds and water projects in their home districts.

However, unlike the ACOE, the Bureau has been able to rely on only a portion of the nation's Congressional membership for steadfast support. Therefore, support for the reclamation activities of the Bureau has often been restricted in Congress to the western irrigation block; whereas the navigation and flood control programs of the Corps has commonly received support from Senators and Representatives across all regions of the country. As a result, it has been suggested that where the Corps and Bureau have been in competition since the mid-1930s, the Interior Secretary has sought support for Reclamation programs from the President's office to offset the more diffuse support which the Corps has traditionally received in Congress (Maas, 1950). However, it is clear that Interior has not always been successful in garnering executive support for BOR projects and as a result, the Bureau and its supporters in Congress soon came to rely upon the same legislative techniques which had brought the Corps much of its success (Maas,

1950). For example, under the directorship of Mead in the 1930, the Bureau began its promotion of a new private lobbying organization, called the National Reclamation Association, which bore the ebullient banner "Without Irrigation Western Progress Stops" (Worster, 1985).

For decades, a host of scholars have portrayed federal water projects as the pork *par excellence* in the US Congress (McCully, 1996; Clarke and McCool, 1986; Reisner 1993; Freejohn, 1974; Drew, 1970; Maas, 1950; 1951). And characteristic of pork barrel politics, reclamation projects in the arid West have been linked to a particular set of political conditions; these have included the following, utilitarian goals and socioeconomic development (e.g., irrigation, hydropower, and recreation); planned construction on regional bases to benefit limited constituencies; huge price tags that are publicly subsidized; and powerful federal construction agencies (which may effectively shield information from the public and defeat most opposition).

Traditionally, Reclamation projects such as dams and water delivery systems have emerged from Congress in large part because of support from a strong tripartite alliance of congressmen (notably members of the Appropriations, Interior, and Agriculture committees); federal agencies charged with construction and maintenance, and water-related constituency groups. Initially, these constituency groups were comprised mostly of irrigators, miners, and ranchers; yet in more recent decades, groups representing urban and industrial interests have become quite powerful. The so-called 'iron triangle' or subgovernments of symbiotic interests that have emerged have often been criticized for ensuring the Congressional authorization of many unnecessary pork barrel projects (Maas, 1951; Drew, 1970; Freejohn, 1974; Reisner 1993; McCully, 1996; Clarke and

McCool, 1996). Moreover, such projects are often environmentally destructive and extremely questionable in terms of cost-benefit ratios and their overall value to society at large. Nonetheless, these types of projects are the ingredients for pork barrel politics and have been shown to effectively galvanize support of incumbent congresspersons on a regional basis (Reisner, 1993; Clarke and McCool, 1996).

Congress, Commissioners, and the Colorado River Storage Project Act

Conditions continued to improve for the BOR during the 1940s and 1950s, as mineral royalties from mining activities on public lands in the West were directed towards the Reclamation fund (Clarke and McCool, 1996). In addition, the national zeal to both create monumental water projects while producing cheap hydroelectric power swept the West. The Bureau was able to effectively capitalize on this hydropower aspect of its irrigation projects throughout this era, as behemoth projects such as Hoover, Grand Coulee, and Glen Canyon Dams were constructed. Many scholars have described this as the golden-era of the BOR in the American West, as the agency was flush with Congressional appropriations and boldly demonstrated its engineering and technical prowess on bodies of water throughout the region (Clarke and McCool, 1996; Reisner, 1993; Wilkinson, 1992; Worster, 1985).

During this time, a major bloc of power representing the arid West was expanding in Congress.[31] This included politicians from Colorado River basin states such as Wyoming and New Mexico, where Senators Joseph O'Mahoney and Clinton Anderson had ascended to powerful positions in the Interior Committee. In addition, Arizona Senator Carl Hayden (the then-longest tenured member of the Senate) had assumed control of Appropriations and Congressman Wayne Aspinall of Colorado had ascended

to control the Interior Committee in the House (Reisner, 1993). Together, these Congressional leaders would offer steadfast support to virtually all of the BOR's water development endeavors. The end-result in the American West would come to be what historian Donald Worster has termed a modern "hydraulic society".[32]

The emergent Congressional clout on behalf of many western states quickly found an outlet in the BOR. In 1936, Congress consented to the Bureau's decades-old request that it receive a regular annual appropriation from the federal treasury – something that it had explicitly promised never to do in 1902 (Worster, 1985). Its first annual appropriation was $16 million in general funds; an amount that doubled by 1939, and doubled again in 1940 (Worster, 1985). And despite the fact that the Bureau was recouping a fraction of these amounts from repayments each year, its annual appropriations continued to rise. By 1950 the figure had reached $314 million and by decade's end, the Bureau's annual appropriation remained relatively high at $154 million (Worster, 1985).

The Bureau's power and prestige were further expanded during this era through the ascendancy of two authoritative BOR Commissioners who, according to Reisner, "believed in dams for dams' sake" (1993). The first of these Commissioners, Michael Straus, was appointed by Franklin Roosevelt near the end of his third term. In his eight-year tenure as head of the Bureau, Strauss would become responsible for as many water projects as any person in the agency's history (Reisner, 1993).

Under his direction the Bureau released its seminal study, *The Colorado River: A Comprehensive Report on the Development of Water Resources* in 1946. This was nicknamed the "Blue Book" and outlined one-hundred-and-thirty-four potential

Reclamation project sites; one in virtually every river canyon and farming valley through the upper and lower basins of the Colorado (Martin, 1999). In addition, Straus's Bureau released a report in 1953 on how the upper basin states (CO, UT, and WY) could develop their shares of the Colorado River. This report would become the Colorado River Storage Project Act (CRSP) of 1956, which authorized a series of ten large dams (including Echo Park, Glen Canyon, and Flaming Gorge) that would provide an expected storage capacity of 48.5 million acre-feet – a volume of water great than all the existing reservoirs on the main-stem of the Colorado, including Lake Mead, and all its tributaries combined (Reisner, 1993). In addition, the CRSP expanded the Bureau's practices of multipurpose, river-basin planning through its direct linkage of irrigation and hydropower production. As a result, the BOR would use a series of 'cash register dams' to subsidize the costs of irrigation in the upper basin states.[33] According to Reisner (1993),

> "Every time they [anyone buying electricity at market rates from the Bureau's dams] flicked a switch, electricity consumers in the region would be helping a farmer plant alfalfa at six thousand feet to feed a national surplus of beef" (141).

The second Bureau Commissioner who would lead the agency to its political and organizational zenith was Floyd Dominy. Dominy became the thirteenth Commissioner of the BOR on May 1st, 1959. By most accounts, he rapidly emerged as the most colorful, powerful, and controversial person to ever lead the agency (e.g., Martin, 1999; Reisner, 1993; Worster, 1985; McPhee, 1971). In fact, a host of contemporaries have said that Dominy wielded more influence on Capitol Hill than any Secretary of the Interior (Martin, 1999; Reisner, 1993; Worster, 1985). Moreover, Dominy was known to frequently attack and defy his three most immediate superiors at Interior – the Secretary,

Under Secretary, and Assistant Secretary – as he pursued his vision for the Bureau in a self-righteous, autocratic style (Reisner, 1993).[34]

During his ten-year term as Commissioner, Dominy oversaw the completion of many of the Bureau's most significant dams; including Glen Canyon, Flaming Gorge, and Navajo – as part of the Colorado River Storage Project. In addition, Dominy was instrumental in the authorization and initial construction on the San Luis Valley Project in south-central Colorado. He also ensured completion of the Trinity River Division Project's four dams and power plants that were key features of California's Central Valley Project.

The Dam-builder, the Archdruid, and the Colorado River[35]

According to Reisner (1993), Commissioner Dominy ultimately would fall victim to his stubbornness and hubris. In particular, these traits were exemplified through his response to the burgeoning conservation and environmental movements and the mounting public criticism of the Bureau's activities as galvanized by David Brower. In many respects, the beginning of the end for the Bureau's dam building heyday came in the form of public outrage over the proposed construction of a dam at Echo Park on the Green River – the Colorado's largest tributary. The dam would have flooded many of the scenic canyons and archeological sites within Dinosaur National Monument. The de facto leader of what became a nationwide campaign to prevent the Bureau from constructing its dam at this location where the Green and Yampa Rivers met was David Brower.

Brower entered the national spotlight in 1952 upon becoming executive director of the Sierra Club, the nation's oldest conservation organization. Brower immediately made the Echo Park controversy top priority for the Club which soon initiated a

nationwide public information campaign against the Bureau and in particular, its plan to inundate vast areas of a national monument under a stagnant reservoir. Brower argued that if the Bureau was allowed to construct this project, it would go on to pursue a deluge of development projects in other protected areas (McCully, 1996). By 1954 Brower had cultivated an attentive audience in the US Congress, where he gave impassioned testimony backed with technical data in opposition of the project.

Specifically, Brower argued that Reclamation engineers had massively underestimated the amount of water that would evaporate from the proposed reservoir and warned Congress that it would be making a gross mistake if it chose to rely upon the figures presented by the BOR – especially when the agency could not perform simple arithmetic (McCully, 1996). These and other economic arguments against the dam mounted and came to expand the resentment held by Eastern legislators over the spending of their (and the nation's) money to build dams in many largely-unpopulated regions of the West.

In addition, Brower and the Sierra Club began offering river trips on the Green through Echo Park in order to expose members of the public to the scenic canyons which the dam would flood. Film was shot on these trips and shown to nationwide audiences in support of the conservations' cause. In partnership with the author Wallace Stegner, Brower went on to publish a book of photos and essays in defense of Echo Park; which he then sent to all the members of Congress, all high-level employees at the Interior Department, and the editor of every major newspaper which had a presumed interest in the dam (McCully, 1996). These and other tactics prompted national coverage of the issue in mainstream magazines such as *Readers Digest* and *The Saturday Evening Post.*

By 1956, a sufficient number of Congressional members had been convinced of the project's flaws and Congress voted against the dam.

Such an unprecedented victory for the burgeoning conservation movement indicated to the media, the public, and Department of Interior that "an important shift in public attitudes had begun, thus "demarcating the postwar generation" (Harvey 1994, 116). Prior to this, and for roughly five years after the war's end, the Bureau had enjoyed enough support from both parties in Congress to attain ever-increasing annual budgets (Harvey, 1994). Yet the events at Echo Park were symbolic of the value shift that had occurred during the affluent post-war years. According to Creighton (1981), such a sea change in popular values caused a great deal of confusion and frustration across the federal bureaucracy. In specific regards to the BOR, Creighton (1981) states the following.

"One way of describing what has happened is to say that up until the 1960s, there was a kind of consensus that if an action was technically feasible and economically justifiable, then the government was acting on behalf of all the publics by taking the action...By the mid 1960s, however, it was clear that this consensus was breaking down. Instead groups advocated a wide range of actions based on widely different – often conflicting – premises" (Creighton 1981, 116).

Nonetheless, the defeat of a proposed BOR dam at Echo Park was anything but an unequivocal victory for the environmental movement. Rather, their initial aim was limited to preventing the construction of dams in federally protected areas. It was not as to stop the Bureau's plans to construct a series of other dams in the upper basin of the Colorado. Despite its setback at Echo Park, the Bureau remained a powerful and its pursuit to construct dams lower on the Colorado and elsewhere would continue.

In fact, the same CRSP bill from which Echo Park Dam was ultimately deleted authorized another, more ambitious project on the Colorado. The same year in which the

conservation movement had achieved its first major victory against the Bureau, the agency began construction on what would become Glen Canyon Dam, located just upriver from the point of demarcation between the upper and lower basin states. In this remote region of northern Arizona, few non-Native American visitors were aware of the diverse cultural and scenic resources of the canyon and tributaries that were slated to become a reservoir. And since the area was not officially protected, most in the conservation movement assumed that it had little scenic and cultural value (McCully, 1996). Yet soon after the Bureau began construction on the massive project, a steady stream of people (including tourists, photographers, artists, and conservationists) came to explore the region and document the canyon that was slated for inundation.

David Brower was among those who visited Glen Canyon shortly before the dam's gates were closed in 1963. Soon thereafter, because he (and the Sierra Club) had acquiesced opposition to the dam and thus its imminent destruction of the Canyon's hidden and unique landscapes, Brower became overwhelmed by grief and remorse. Shortly after the reservoir had filled to capacity, Brower described his inattention and ultimate failure to save Glen Canyon and stop the dam as "the greatest sin I have ever committed" (McCully 1996, 285). The finished product would be larger than Hoover Dam, rising 710 ft. above the canyon floor and spanning a width of 1,560 ft.; their enormous reservoir has been described by the Bureau as the "Jewel of the Colorado" (US BOR, 2005c).

For its part, the spirits of the Bureau and Commissioner Dominy in particular were buoyed by the dam's successful completion. The same year that it closed the gates at Glen Canyon, the agency announced plans to construct two additional dams in the

Grand Canyon in order to produce the hydroelectricity needed to pump water diverted from the Colorado to the fast-growing desert cities in central Arizona.[36] This prompted an immediate and aggressive response from the conservation movement, and Brower in particular. The public concern and political scrutiny this aroused persuaded Interior Secretary Steward Udall to effectively "kill" both dams (Marble and Bridge Canyon) in 1967 (McCully, 1996).[37]

This defeat in the wake of its success at Glen Canyon was a significant setback for the BOR. According to Reisner (1993), Dominy would go on to sacrifice the remaining years of his career at the Bureau in order to secure authorization for the Central Arizona Project – which in its amended form was smaller in size than originally intended and paled in comparison to the grandiose Pacific Southwest Water Plan that he had envisioned. Currently, few of the other massive projects conceived by Dominy during his tenure at Reclamation have materialized.[38] And any real support for perhaps the Bureau's most ambitious plan of the Dominy era – to divert water from the Northwest's Columbia River basin to the desert Southwest – has all but vanished (Martin, 1989).

III. Mainstream Environmentalism and a post-NEPA Political Environment

According to Palmer (2004), the dramatic leveling-off of the Bureau's activities began with its defeat over the Marble and Bridge Canyon Dams on the Colorado. Accordingly, "the battle of the Grand Canyon dams was a central, symbolic event which played a major role in awakening environmental awareness in America" (78). Regarding the larger impact on other federal agencies, the ACOE was informed the same year that Secretary Udall deleted the Grand Canyon dams that it too would have to scale back its

dam building ambitions and both agencies were stopped from constructing projects of unprecedented scales in Alaska (McCully, 1996).[39]

Yet even prior to the Bureau's setbacks on the Green and Colorado Rivers, Clarke and McCool (1996) argue that the agency had begun to show signs of organizational decline by the early 1950s. And while the Bureau has long-since been a conspicuous target for environmentalists, a number of other factors in addition to the advent of the modern environmental movement has contributed to its compromised status. These include the increased scarcity of "good" dam sites and potentially rich farmland, continued competition with the Corps for future projects, fiscally-conservative politicians, and a capricious budgetary history that parallels its organizational history (Clarke and McCool, 1996). Added to these obstacles faced by the Bureau is the reality that their original mission to reclaim the arid West via irrigation-oriented water projects has, for the most part, been completed. As such, the agency's claim to hegemony over water development in the American West has been largely compromised. In their oft-cited comparison of agency power in the domain of water resources, Clarke and McCool (1996) ranked the BOR a distant third, behind the Corps and the Environmental Protection Agency (respectively) (Clark and McCool, 1996).

The impact of NEPA on the operations of the federal bureaucracy was undeniable. Beyond its declaration of a national environmental policy, the Act mandated the consideration of environmental concerns by federal agencies. Perhaps most significantly, NEPA has drastically affected the federal decisionmaking process and has influenced thousands of federal projects and operations. However, the changes this has prompted in behaviors and activities across the public sector (along with other policies of

the "environmental decade") are far from equal. Rather, bureaucratic responses have varied, with some organizations reacting more proactively and affirmatively than others.

For its part, the Bureau's response to NEPA requirements and other environmental challenges has been consistently identified as belated, partial, and contemptible (e.g., Lowry, 2003; Espeland 1998; Clarke and McCool, 1996). In particular, the EIS requirement has presented a number of problems for the Bureau since the 1970s, as the agency has experienced considerable difficulty in meeting the extensive requirements for environmental review and for the planning of ecologically sensitive and nonstructural alternatives (Clarke and McCool, 1996). And unlike the Corps, personnel within the Bureau were initially skeptical and resentful of NEPA-mandated procedures and by extension, less successful in augmenting their traditional mission with more environmentally oriented activities (Clarke and McCool, 1996).

Nonetheless, the passage of NEPA gave legitimacy and clout to an emergent public voice and public value, which prior to the 1960s had generally gone unheard by federal agencies – including the BOR (Lamb, 2004). As a consequence, NEPA is part of what made 1969 a significant year for the BOR. For the first time, the Bureau conducted and finalized an EIS for the ill-fated Teton Dam. That year was also the first time since the 1940s – when the Bureau began publishing an annual statistical presentation of its accomplishments – that it initiated changes to these presentations, in terms of titles and types of information conveyed to its customers (Lamb, 2004).[40]

The Bureau's Old and New Guard

In a sociological account of the Bureau's Central Arizona Project (CAP) and the proposed construction of Orme Dam, Espeland (1998) examines how the political fallout

of NEPA in general, and the EIS requirement in particular, led to profound effects on the agency's culture or dominant operational ethos. [41] The proposed dam (previously named McDowell Dam) had nothing to do with Colorado River water – the main impetus for CAP. Rather the dam was added to the CAP project as a way to help store and regulate the flow of water on tributary rivers (the Salt and Verde) that would supplement the water imported from the Colorado. Arguably, Orme Dam was tacked on to the CAP because its proposed location was seen as a "good" dam site (that was empty), thus giving the Bureau another project (Espeland, 1998).

The traditional Bureau employee is portrayed by Espeland as the "Old Guard", representing an older male engineer intensely loyal to the agency's original mission and overtly suspicious of NEPA; unconvinced of the Act's usefulness and reluctant to abandon the agency's traditional modus operandi that had produced so many "great" projects. Similar to the "instrumental reason" discussed by Worster (1985) as a defining feature of the BOR mindset, Espeland (1998) describes the ethos of the Old Guard as grounded in scientific rationality; promoting technical solutions to social problems. [42] This involved a perception of nature as God's unfinished handiwork that required taming through the activities of man.

Espeland relates the Old Guard's ethos and its ultimate passing to the themes associated with the Bureau's ambition to construct Orme Dam. Specifically, the changes in tone and content of BOR documents are traced in relation to changes stemming from the maturation of the mainstream environmental movement. In this sense, the initial CAP-related Bureau reports (1940s-60s) – which ultimately informed the draft EIS in 1972 on construction of the CAP – were indicative of the BOR's traditional ethos. No

alternatives to the dam were considered and no mention was given to the possibility of negative social and ecological impacts. Rather, the CAP was glorified as the project to rescue Arizona's economy that was on the verge of collapse. Such skewed coverage would constitute the primary analysis of CAP throughout its authorization.

In addition, the Bureau expounded the benefits which would follow a completed CAP; including its boon to agriculture, a bolstered economy, the development of new farm land, and preventing the desert from *reclaiming* the state's already cultivated lands (Espeland, 1998). The extensive loss of riparian habitat and archeological resources, elimination of river recreation at numerous sites, and the impending relocation of the Yavapai tribe were never mentioned in either the Bureau's early reports or its draft EIS. In fact the only "environmental" consequences of the project officially acknowledged by the BOR were posited as neutral or positive; including flood control and enhanced fisheries in the reservoirs to be constructed (US BOR, 1972).

As required by law, the draft EIS was made available for public review and immediately drew widespread criticism. Of primary concern was the utter lack of consideration over both alternatives to the CAP and the potential for social and environmental impacts. In response, the Bureau included limited information in the final document about social and environmental impacts and brief discussion about alternatives – all of which were labeled as unreasonable (Espeland, 1998).[43] In particular, the project's potential impacts have been described as the following:

> "[They were] either stated so vaguely, or given such cursory treatment, or framed as beneficial, so that the final EIS [remained] more of a robust defense than an objective analysis of CAP" (Espeland 1998, 116-117).

Nonetheless, Espeland does suggest that the mere inclusion of such information points to evidence of an emergent, changing ethos within the Bureau. Yet she references internal memos and agency reports to indicate that most of the Old Guard considered the EIS a "legal hoop" through which to pass and official document that would serve to withstand the attacks of the agency's new nemesis – environmentalists. As such, the "Old Guard" was still in charge of the Bureau and its traditional modus operandi remained entrenched.

However, by the time the 1976 draft EIS was released, which was entirely devoted to Orme Dam, Espeland maintains that it had become evident that the Bureau had made legitimate attempts to investigate and rationalize the environmental impacts associated with the project. And despite the continuance of the document's partisan tone, the 1976 EIS was less restrained in identifying adverse environmental impacts. The EIS therefore became the forum for organizing and expressing opposition to the dam in particular, and to the CAP project in general (Espeland, 1998).

Moreover, the 1976 EIS signaled changes regarding both the Bureau's commitment to the EIS process and the overall image of the project in a number of ways; all of which unsettled Bureau employees clinging to the traditional ethos (Espeland, 1998). First and foremost, changes in policy direction stemming from NEPA's passage had been given time to permeate all aspects of the federal bureaucracy and the preparation of EISs had become an accepted statutory process. As such, the institutionalization of environmentalism had begun. Also, NEPA's public participation requirements provided a forum for citizen comments and feedback from organized interests.

According to Espeland (1998), the earliest and most important effect of NEPA was the insertion of a small number of nontraditional employees into the Bureau (i.e., the "New Guard"). These individuals came to the Bureau with expertise in biological and/or social sciences and were intended to facilitate the preparation of EISs. The so-called "New Guard" tended to exhibit more sympathy to environmental concerns than traditional Bureau employees, were highly committed to the more inclusive decisionmaking processes required by NEPA, and were more prone to make agency knowledge available and accessible to the public sector in order to encourage public participation and the incorporation of public values and opinions into agency decisionmaking.

Espeland maintains that NEPA had created an organizational constituency within the Bureau that ultimately became the basis of group identity for the New Guard. Accordingly,

> "in changing the terms of relevancy, NEPA helped disclose as distinctive and controversial what the Old Guard had presumed was universal, as its members were finally forced to confront the relativity of their long-held worldview" (Espeland 1998, 21).

As a result, the traditional engineering ethos that had been naturalized within the Bureau was now faced with an alternative and competing worldview which, according to Espeland, was a signal that the traditional culture and operational ethos within the BOR was to be transformed.

An "Organizational Shooting Star"

The approach put forward by Clarke and McCool (1996) examines the factors related to performance differences that exist among federal agencies and ultimately, why these differentials are important in policymaking and implementation. Just as Espeland

(1998) was concerned with explaining agency performance in meeting the EIS requirement in a procedural versus substantive way, Clarke and McCool intend to discern what accounts for agency performance differences. They ultimately argue that it is a set of organizational and political conditions that have produced different types of agencies within the executive establishment.

They describe two sets of such factors that act as the primary source of agency power. The first is expertise and the related control of information. This includes the nature of an agency's mission, the relative presence of astute leadership, the extent to which the agency embodies a highly regarded profession, and whether an esprit de corps permeates the organization. The second set represents political and constituency support. Of particular concern are the existence of an optimal-sized constituency, the extent to which an agency's mission is linked to majoritarian and/or economic interests, whether an agency is service- or regulatory-oriented, and its level of intra-governmental support. Based on these criteria, Clarke and McCool (1996) offer a typology of executive agencies; ranging from those which are very successful and secure, to moderately so, and those which face a precarious future.[44]

The Bureau of Reclamation is said to reside in the latter category; that of an "organizational shooting star"– an agency that rose quickly and burned brightly for a short time and then declined (Clarke and McCool, 1996). By extension, today's BOR faces a precarious future. Despite its notable start and lofty goals of the Progressive era, sustained growth by the Bureau was quickly compromised by financial difficulties related to the structure of the original repayment scheme. Congressional action worked to ameliorate many of these early problems and the Bureau ascended quickly to its

organizational zenith during the 1930s – 50s. Yet soon thereafter, a combination of conditions led to a sustained period of organizational decline that would last for nearly thirty years. This primarily resulted from the Bureau's geographically-constrained mission, its dependence on a regionally-based constituency, competition with the more powerful ACOE, Congressional preference that it operate with earmarked monies, and the controversies and environmental mandates that emerged during the 1960s and 70s (Clarke and McCool 1996, 175-176).

Competition and Failure

"... the relationship between the Bureau and the Corps was always at least competitive if not antipathetic" – Lowry 2004, 50.

As discussed in the previous chapter, a persistent lack of cooperation and outright competition between the BOR and ACOE often led to ill-conceived and unnecessary projects simply because one agency feared the other would secure funding and initiate construction first. According to Clarke and McCool (1996), such competition reached a peak during the mid-1960s; with the Bureau unable to mount any real significant challenge to the Corps' traditional dominance. Moreover, the Corps was more successful than the Bureau in securing project authorizations during the waning years of the dam-building heyday. In fact, the Corps' monopoly on water projects was evidenced during this era, as its planning and construction activities surpassed those of the Bureau in the latter's "own" original territory – the Pacific Northwest (Clarke and McCool, 1996).[45]

By the 1970s, virtually all of the prime dam sites for Reclamation projects had been developed and the perception mounted that the agency's guiding mission had been practically completed (Clarke and McCool, 1996). According to congressional appropriations hearings in 1975, BOR officers admitted that "the original objective [of

the Bureau] had been met ... The West [was] now developed" (Clarke and McCool 1996, 137). Indeed, such a condition posed a real threat to the Bureau's continued existence and served to further increase its competition with the Corps. As a result, the Bureau began to pursue increasingly dubious projects, many of which were located at sites that it had rejected during previous decades (Reisner, 1993). Yet despite this paucity of premium dam sites, the BOR pressed on as its water projects remained highly coveted by western politicians who continued to lobby for dams in their districts and states. According to Reisner (1993),

> "The Bureau, of course, rationalized its decision to keep building by claiming that advances in engineering were keeping up with the challenges. Even though it was now building dams on rotten foundation rock, between spongy sandstone abutments, in slide-prone canyons, and close to active earthquake faults, the dams held – for now" (383).

The most dramatic example of a questionable and ill-considered BOR project came with the failure of Teton Dam in June of 1976; roughly seven months after its completion. The dam was to be a key feature of the Lower Teton Division of the Bureau's Teton Basin Project (US BOR, 2005d). Its primary purposes were to be irrigation and hydroelectric generation and not surprisingly, it enjoyed support from all of Idaho's congressional delegation – led by four-term Democratic Senator Frank Church.[46]

Despite a major lawsuit and a wealth of scientific evidence suggesting that the dam's proposed site was wholly unsuitable because of underlying weaknesses in its foundation and possibility of seismic activity, the project was authorized in September of 1964 and cost over $85 million when completed.[47] According to Andrus (1998), the Bureau's institutional pride and its ideological commitment to the dam were at stake, which led it to ignore a warning from its own project manager of "unusually large" fissures in rock formations of the right canyon wall.

The failure of the 305-foot tall, 1,700-foot wide structure on eastern Idaho's Teton River resulted in eleven deaths, the destruction of 4,000 homes, three-hundred businesses, and damages of more than $2 billion (Reisner, 1993). Ironically, the dam failure and resultant flood destroyed more land – permanently so nothing could be grown there again – than would have been made available to irrigation by the dam. In addition to these economic losses, the dam's failure had put tens of thousands of Idahoans at serious risk and had the event happened at night, the death toll would surely have been much higher (Reisner, 1993; Andrus, 1998).

In response, the same politicians who had offered the most support for the dam's construction harshly criticized the Bureau immediately after its failure. The result was devastating for the agency, as it reputation was quickly and permanently compromised. Public confidence in the agency was all but lost (Clarke and McCool, 1996). Nonetheless, according to Reisner (1993), the Bureau said little about the dam's failure and beyond its curt recap of events offered to the public,

"there was no hint of responsibility, not even sympathy for the flood's victims, and no suggestion that perhaps the dam shouldn't have been built" (408).

After the disaster, political cartoonist Pat Oliphant captured such an attitude in depicting a beefy BOR bureaucrat sitting at his desk and declaring, "If we listened to every environmentalist dingbat, we'd never get anything built." In the background Teton Dam was bursting, with cows and houses hurtling into the air (Andrus, 1998).

Executive Challenge to the Status Quo

President Carter entered the White House during a period when the cumulative federal debt was nearly $1 trillion and inflation had already reached the double digits, yet federal water bureaucracies continued to spend roughly $5 billion per year (Reisner,

1993). In response, Carter offered a platform that emphasized government reorganization and the elimination of waste in federal expenditures. His intent was to streamline the federal budget by taking on the water establishment in Congress and specifically, by targeting specific dams he saw as largely unnecessary and deceivingly justified by BOR cost-benefit analyses. By the end of Carter's term, the Bureau's budget had been reduced by thirty-seven percent (Clarke and McCool, 1996). [48]

In an attempt to confront the system of pork barrel spending that led to ill-conceived projects such as Teton Dam, Carter issued his infamous 'hit list' for some nineteen ongoing federal water projects in early-1977. Eight of the targeted projects were already under construction by the BOR. And despite an immediate and strong protest by Western governors and congresspersons, Carter submitted a list in June of 1978 with an additional twenty-six projects slated for deletion or modification. Nine of these were being built by the Bureau. The same year, Carter further reduced the operations of the BOR by transferring its responsibilities for hydropower marketing to the newly-created Department of Energy. In addition, Carter's proposed 1979 budget for the Bureau was $618 million; a $63 million reduction from its appropriations the previous year. A no-new-starts policy was also imposed by Carter for fiscal year 1979 (Clarke and McCool, 1996).

Furthermore, Carter sought to reorganize the Bureau in terms of both its methods of operation and structure. Regarding the former, he issued an executive order which subjected federal water projects to new criteria. The Water Resources Council (WRC) was ordered to establish a new set of standards and principles for project planning and to complete an "impartial technical review" of all preauthorization studies. The WRC was

also charged with developing an alternative planning manual for the calculation of costs and benefits – and guidelines for their consistent application (Clarke and McCool, 1996).

Regarding the Bureau's structure, Carter proposed a comprehensive reorganization plan whereby all the planning and analysis functions from both the BOR and ACOE would be transferred to the WRC. And for the Bureau specifically, the plan called for the transfer of its design and construction activities to the Corps. In addition, Carter proposed a series of topical reforms to the nation's water policy and public works domain. Specifically, he sought to promote a heightened emphasis on environmental protection and water conservation, an increase in dam safety, a program of increased cost sharing among states and the federal government, and a complete redirection for the nation's public works program (Clarke and McCool, 1996).

Name Change, Reforms, and Reorganization

Carter's Secretary of the Interior, Cecil Andrus, forced the Bureau in 1979 to change its name to the Water and Power Resources Service (WPRS). According to Clarke and McCool (1996), this signaled to many that the Bureau's traditional role of massive water project builder in the West was about to expire. Officially, Secretary Andrus stated that the change was to reflect the administration's desire to severely limit future construction activities by the agency. According to Andrus,

"national needs now call for greater efficiency in the operation of *existing* structures and their integration in new programs for renewable resources and alternative energy" (Clarke and McCool 1996, 142).

In response, the 'new' WPRS began to develop programs to investigate areas such as wind energy and cloud seeding; yet such newfound responsibilities produced little and failed to rescue the agency from a steadily decreasing budget. In addition, then-

Commissioner R.K. Higginson announced a number of other new programs which the BOR planned to develop in the 1980s. Chief among these were the Public Involvement and Environmental Education Programs (Clarke and McCool, 1996).[49]

In an effort to become more proactive in responding to public concerns over the environmental and social impacts of its activities, the Bureau began to feature chapters on archeology and cultural resource advancements in its Federal Reclamation Projects Summaries in 1976 and 1977. Perhaps motivated by the "New Guard's" commitment to make agency knowledge available to the public sector, the Bureau provided this information publicly, nearly two years before the Archaeological Resources Protection Act (ARPA) – one of the most stringent of the Acts with which Reclamation must comply – was passed (Lamb, 2004).

Reagan and Reclamation

Under new Presidential leadership, the agency reclaimed its old name in 1981[50]. And despite assurances from Reagan's new Secretary of the Interior, James Watt, that the "War on the West" initiated by Carter was over, the new administration was also committed to dramatic cuts in the federal budget (Lamb 2002, 144). To confound the situation, the traditional clientele of the Bureau (e.g., western agriculture, ranchers, and associated businesses) had offered strong support to Reagan's successful 1980 campaign and the incoming administration was thus compelled to offer at least some form of return support. With these dual impulses to reduce federal spending while continuing to support water development in the West, the Bureau's budget over the next eight years would involve an erratic pattern of both increases and decreases. The end result was that the Bureau's annual budget remained virtually static during the Reagan years, with no

increases added for inflation. Also during this time, there was mounting recognition that reclamation water was overtly subsidized and thus undervalued. This led to calls from both the Reagan administration and environmental community for increased user charges, which would reduce the financial burden of the reclamation program on the federal government while encouraging water conservation efforts (Lamb, 2004).

In 1987, the Bureau announced a new direction and mission in its ongoing attempt to reorient itself as an agency. According to its 'Assessment '87',

"a number of trends and changing circumstances require a reevaluation of the Bureau's mission and its priorities ... this reality suggests strongly that the era of constructing large Federally financed water projects is drawing to a close" (US BOR 1987, i).

According to Lamb (2004), the intent of Assessment '87 was to provide mechanisms for improved public relations for the remainder of the 1980s and beyond. And while the Assessment declared its commitment to addressing new "major public concerns" such as water conservation and environmental protection, Clarke and McCool (1996) maintain that ultimately, it proved to be an incomplete transition. Specifically, they posit the existence of substantial resistance to this proposed new direction came from both within the agency and among its congressional allies. Similarly, Lamb (2004) acceded that despite the Bureau's commitment during the 1990s, the agency's exact plans on how to implement this new strategy did not – and have yet to – fully materialize.

Another example of the Bureau's nearly continuous effort to redefine its mission came in the early-1990s with Interior Secretary Manual Lujan's program called the "Legacy '99 Initiative". The intent was to shift the Bureau's focus from project construction to newer, more efficient forms of water management. The result was greater

emphasis on operations and management, as a means to address the agency's maintenance backlog of roughly $195 million (Clarke and McCool 1996, 155).

Clinton, Reclamation, and a New Mission

"... our [the Bureau's] traditional approach for solving problems – the construction of dams and associated facilities – is no longer publicly acceptable. We are going to have to get out of the dam-building business. Our future lies with improving water resource management and environmental restoration activities, not water project construction" – Daniel Beard, 25th Commissioner, US Bureau of Reclamation.[51]

In addition to Assessment '87 and Legacy '99, the Bureau issued yet another mission statement in its 1992 Strategic Plan. On the 90th Anniversary of the signing of the 1902 Reclamation Act, it unambiguously stated that its new mission was to "manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public" (US BOR, 1992).

Indicative of this "new" BOR was the 1992 appointment of Daniel Beard as Commissioner by the newly-elected President Bill Clinton. Beard was clearly not from the same stock as many of his predecessors, especially those such as Floyd Dominy. Rather, Beard was not an engineer and was never employed by the Bureau prior to his appointment. Dominy on the other had ascended through the ranks of the agency.[52] Moreover, Beard was (and continues to be) an avowed environmentalist and self-proclaimed liberal Democrat who not only expressed on several occasions his hope that no new large dams would be necessary, but that he would not mind taking down some smaller dams – especially those that have ruined salmon habitat (Reisner, 1993). Indeed, dams had little or no place in Beard's vision for the future of Reclamation as he indicated in numerous statements on how both the Endangered Species Act and the changing

culture at Reclamation were moving the agency in a direction contrary to that of the past. In stark contrast, the eighty-four year old Dominy stated in a 1995 interview,

"Now I'm sure people can survive without salmon, but I don't think people can survive without beans and potatoes and lettuce...I think the salmon-blocking dams are worth it. I believe there are substitutes for eating salmon. You can eat cake" (Reisner 1995, 147).

Beard unexpectedly resigned in June 1995 and when asked to explain his motives, he indicated that his job was simply done;

"When I came here two years ago, I came to change the organization, to make it more environmentally sensitive and to put less emphasis on construction" (Marston, 1995).

Despite his brief tenure, many assert that Beard had the largest impact on the agency's reorganization in his push for the agency's transition from construction agency to water resources management leader (e.g., Marston, 1995). Beard also insisted Reclamation take new approaches toward water conservation and environmental issues, and he demanded the agency recognize the increasing demands of cities on Western water (US BOR, 2005e). In pursuit of such goals, his actions reduced the Bureau's staff by twenty percent (from 7,965 employees to 6,474) and its budget by more than $100 million (from $911 million to $804 million) (Marston, 1995). When asked whether his experience at the Bureau had any lessons for other land and resource agencies, Beard replied,

"Government agencies ought to change over time ... A lot of agencies love to lurch along in the same old ways ... Yet American society is different in 1995 than it was in 1965. But the underpinnings to land management are legislation out of the 1960s" (Marston 1995, 2).

Recent Commissioners

As for Beard's two most immediate successors, both were former engineers; Stephen Magnussen was appointed "acting" Commissioner in 1995 and Eluid Martinez was later nominated and confirmed the same year. Almost immediately, Martinez

engendered significant concern within the environmental community. For the most part, this stemmed from his four-year tenure as New Mexico's state engineer and his twenty-one years of employment under the state's former engineer whom Martinez has fondly recalled as the "last of the great water buffaloes of the West" (Marston, 1995).

Only time will demonstrate how and in which direction (that of Dominy versus that of Beard) the Bureau of Reclamation will evolve. It is rather clear that the construction era of large-scale federal dams has expired and that the future of BOR will be in one or a combination of the following areas; water marketing and transfers, rehabilitation of urban water delivery systems, amelioration of salinity and siltation problems in existing projects, rehabilitation of endangered species, and inter-basin transfer projects (McCool, 1987). [53]

The current BOR Commissioner, J.W. Keys III, assumed the reins of this once-powerful agency during a historic, yet uncertain time. His July 2001 confirmation came amid reports that angry irrigators were committing vandalism at Reclamation facilities in Oregon's Klamath Basin and environmentalists were threatening to blow-up the Bureau's Navajo Dam in New Mexico (River Network, 2001). Notwithstanding, Keys appeared ready for the challenge. Prior to becoming Commissioner, he was the Bureau's Pacific Northwest Regional Director from 1986 to 1998. During this time, Keys worked successfully to facilitate collaborative action among coalitions of stakeholders who were working on meeting ESA requirements. In fact, environmentalists welcomed the appointment of Keys; in large part because of this work for which he was awarded Interior's highest honor – The Distinguished Service Award – in 1995 for maintaining

open lines of communication and keeping interest groups focused on solutions (River Network, 2001).[54]

IV. New Missions and Persistent Problems for the 21st Century Bureau

Clarke and McCool (1996) posit four basic problems that will continue to complicate the Bureau's ongoing attempts to reinvent and redefine itself into a viable and relevant agency for the twenty-first century. Clearly, this organizational shift from structural solutions to water supply problems and a genuine commitment to restoring the river systems compromised by previous projects are central to such an undertaking. Yet working to frustrate such a change, the Bureau has consistently faced the specter of federal budget cuts. Over the last fifteen-odd years, the Bureau's annual budget has remained static yet when considering inflation, it has steadily declined. For example in 1993, the Bureau's total budget was slightly less than $1 billion and its budget request for FY 2005 was $970.5 million (Clarke and McCool, 1996; US BOR, 2004).[55]

A second continuing problem for the Bureau stems from a handful of its largest projects built during the waning years of the dam-building heyday (e.g., the CAP, Central Utah Project, the A – LP, and the Garrison Diversion Unit. In sum, the economics of these projects have proven unrealistic and unworkable, initial authorizations have been overspent, and environmental impacts have been tremendous. Together, such conditions have caused these and other BOR projects to encounter persistent criticism and widespread opposition (Clarke and McCool, 1996).

A third basis for continued problems for the BOR is a steady stream of criticism over subsidies, below-cost pricing, and economic efficiencies related to its projects. This has prompted a barrage of criticisms over the Bureau's traditional use of interest and

pricing subsidies from a diverse group of economists, fiscal conservatives, and environmentalists (Clarke and McCool, 1996).

And lastly, a fourth set of problems facing the contemporary Bureau relate to the multitudes of negative social and environmental impacts that have mounted over the years since many of its projects were constructed (Clarke and McCool, 1996). Ironically, the same Bureau which zealously, optimistically, and unquestioningly built a host of water projects across the West is now wrestling with the prospect of how a majority of its new mission will involve the cleaning-up of related problems. When asked about the agency's future activities in river restoration and even dam removal, the forty-year Bureau employee and current director of its Western Water Operations, Steve Magnussen, stated the following.

"Our authority is for building dams, we don't have organic legislation giving us a basis for restoration" (Lowry 2004, 51).

V. Savage Rapids Dam and the Bureau of Reclamation

"Although dams are seemingly permanent (albeit recent) features of the Northwest riverine environmental, like all artificial structures, they have a finite engineering and economic life expectancy... Where dams are a significant contributor to the decline of salmon runs, dam removal is an obvious rehabilitative alternative" – National Research Council (1996).

Similar to the Corps' Elk Creek Dam, the story of the Bureau's involvement with Savage Rapids Dam is one defined by early and sustained local support for the project; a willingness on behalf of elected officials to enlarge this support in the US Congress; questionable cost – benefit analyses; and compounding evidence of environmental degradation and accelerated rates of mortality to threatened and endangered populations of native fish.[56] In addition, an ideological resistance to both the concept and symbolism of dam removal among many area citizens and their representatives in the

state legislature has led to expensive legal and political battles over the dams (Hunter, 2005). For both Elk Creek and Savage Rapids Dams, science and economics point to removal as the most logical means of river restoration; in both instances however, local apprehension and misconception related to the symbolic power of dam removal have stalled restoration efforts while increasing populations of anadromous fish unnecessarily fall victim to political debate. This suggests mixed support for the perspective offered by Lowry (2003) to anticipate different types of policy change. And while the path to removal of the Savage Rapids Dam appears more certain and straightforward than that of Elk Creek, the ongoing battle over the fate of this eighty-five-year-old dam and diversion structure has similarly been fought on the ground in the communities of southern Oregon and by proxy at the federal level in Congress, the courts, and bureaucracy.

Grants Pass Irrigation District and the Rogue River

The Grants Pass Irrigation District (GPID) was organized in 1916 by local water users in southwestern Oregon's Josephine County, a region where annual rainfall averages roughly twenty-nine inches (GPID, 2002). Previous to GPID's formation, a steady stream of prospectors and ranchers had settled in this relatively dry corner of the Pacific Northwest; a subsequent increase in agricultural activity made large-scale development of the region's water resources a necessary priority (GPID, 2002). By 1921, GPID had sold enough bonds and levied sufficient taxes to privately finance construction of the original diversion dam and system of water delivery on the mainstem of the Rogue River – the region's largest river, at a location roughly 120 miles upriver from its mouth on the Pacific coast.[57] With completion of the thirty-nine-foot-high, five-hundred-foot-long structure in November 1921, GPID's quest to bring irrigation water to a string of

developing agricultural communities along the banks of Oregon's Rogue River had been initiated.

The dam's original purpose was to service an area of approximately 18,000 acres via a system of pumps and canals. Built strictly as a diversion dam, Savage Rapids "stores" a trivial volume of upstream; it provides no flood control and has never been used to generate hydroelectric power. Rather, the goal of GPID has strictly been to deliver water diverted from the Rogue to areas farther upriver that were being simultaneously being organized and planned for incorporation into the GDIP (US BOR, 1977). To this end, the dam's pump-turbine system has delivered water for more than eighty years via a system of pipelines and canals; the total length of canals is approximately sixty-seven miles, with additional laterals delivering water to project lands (US BOR, 2006; GPID, 2002).

Since the dam's completion however, the anticipated settlement of nearby lands and the clearing of previously undeveloped areas, activities which constituted a high proportion of the GPID's area, has failed to reach the extent of expectations upon which the district was founded and financed (US BOR, 1977). As a consequence, roughly half of expected irrigable area was put into production; this smaller-than-expected area would come to bear sole responsibility for the District's entire tax burden and repayment burden.

To complicate matters, a series of floods beginning in 1927 severely damaged the dam and water delivery system; emergency repairs were made, but the lack of sufficient funds from the District prevented it from ensuring the satisfactory completion of all repair activities. By 1949, the cost of maintenance on the diversion dam's main pipeline

and canal had become almost prohibitive; from this point on, BOR would serve as the primary federal agency responsible for repair and maintenance activities at Savage Rapids Dam (US BOR, 2006; 1977).

In 1929, the State of Oregon granted GPID a water use permit to divert 230 cubic-feet-per second (cfs) in order to irrigate 18,393 acres of land. Such a permit represented GPID's initial and temporary authorization to begin construction of a canal-based delivery system for the specified volume of water. Yet according to Oregon water law, the holder of a water use permit must apply the entire specified amount to 'beneficial use' – without waste; the permit holder must also eventually demonstrate the actual number of acres which have been developed under the permit (Hunter, 2002). In 1984, the agency in charge of administering this policy, the Oregon Water Resources Commission (OWRC), completed its review of GPID's use and application of the diverted water, finding that only 7,738 acres were under irrigation. As a result, OWRC issued a final certificate for just under 97 cfs to GPID – much lower than the original request for 230 cfs (Hunter, 2002).

In large part, GPID's failure to fully develop and irrigate its originally-permitted 18,393 acres was caused by dramatic changes in land use patterns throughout the irrigation district. Specifically, the area – including Josephine and Jackson Counties – had become much more urban and suburban than originally assumed; currently most lands lie within the (urbanized) city limits of Grants Pass and Rogue River, OR. By extension, the average sized parcel of land currently receiving water from GPID is less than two acres; more than half of these are less than one-half acre and are not utilized for commercial agricultural production (Hunter, 2002; 2005).

In April 1990, a settlement was reached between GPID and OWRC, which allowed the former to (temporarily) continue water diversions at the historical rate. GPID however was required to conduct a study and develop plans for addressing the various public interest concerns over water use and fish mortality that had amplified over the previous twenty-odd years. In December 1994, GPID issued its formal plans to establish a water conservation plan and a separate plan to resolve fish passage problems by removing Savage Rapids Dam and replacing it with an expanded pumping system, in order to continue water deliveries to its remaining customers on some 7,500 irrigated acres; hay and pasture are the principle crops produced in the GPID (US BOR, 2006).

During this study, GPID worked closely with the US BOR and US FWS in order to completely address concerns over fish recovery at the dam. The end result of this collaboration was the Bureau's Planning Report and 1995 Final EIS, entitled "Fish Passage Improvements at Savage Rapids Dam". In the EIS, the Bureau indicated that its preferred alternative for resolving fish passage problems was to completely remove the dam and replace it with an expanded pumping system. The Bureau had reasoned that dam removal provided more benefits and was cheaper than any other viable dam retention alternatives – and that it provided the only *permanent* solution (Hunter, 1998). According to Hunter (1998),

"The basic reason [for removal of Savage Rapids Dam] is fish passage; the National Marine Fisheries Service has called this dam the biggest fish killer on the Rogue, and the fish it kills are salmon and steelhead whose populations are severely depressed" – (29).

Notwithstanding, a new GPID Board of Directors was elected only months after the Bureau's release of its preferred alternative; its first point of business was to renege on the previous commitment to remove the dam. Thus began GPID's statewide lobbying

effort to keep the dam. Also in 1995, the newly-elected president of the Oregon Senate made saving the "beautiful" dam a top priority for the state (Hunter, 2005a).[58] For the next decade, a political and legal campaign would ensue, driven by the efforts of both dam advocates and dam detractors at the state and local levels, the US Congress and Department of Interior, and the federal courts.

The Bureau's Historical Tie to Savage Rapids Dam

The Bureau's association and involvement with the Savage Rapids saga began long before the release of its preferred alternative to remove the dam in 1995. In fact, BOR's status as the dam's principal, federal-level administrator dates back much further, to at least a half-century prior to its initiation of the dam removal study. For the most part, the Bureau's initial involvement was a result of the severely degraded physical state of the dam and its water diversion system; environmental concerns, while present at the time of construction, were not the primary factor driving federal involvement on behalf of BOR.

Since the maintenance costs for the dam's diversion and delivery structures had become nearly prohibitive by 1949, BOR was requested by the US Department of Interior to investigate and ultimately replace virtually all significant components of the dam proper and its water delivery system between 1949 and 1959.[59] Specifically, the Interior Department Appropriation Act of 1950 authorized emergency reconstruction of the dam's Northwest Unit pipeline, which was responsible for water delivery to roughly fifty-percent of the GPID. Similar appropriations were authorized in 1953 for rehabilitation of the Savage Rapids Dam itself, and anadromous fish passage improvements were authorized for construction at the dam by the Reclamation Development Act of 1974 (US

BOR, 1977). Prior to this, the original (circa 1921) fish screening facilities failed to function properly and were only operated during certain months of the year. As a result, innumerable downstream-migrating fingerlings and salmonoids were destroyed each year (from 1921 – 1978) from passing through the dam's turbines and pumps (GPID, 2002). And since the mid-1970s fish passage improvements, federal agencies estimate that there remains between a fifteen- and twenty-five-percent annual mortality rate of young Coho salmon associated with the Savage Rapids Dam (American Rivers, 2006f).

To Breach or not to Breach

For its part, the Bureau has officially endorsed dam removal as the preferred means of river restoration on the Rogue since the December 1994 release of its EIS. Specifically, the dam removal alternative was described as providing more benefits and less-expensive than any viable dam retention alternative – and removal would provide the only permanent solution. Around the same time, GPID and the OWRC forged an agreement, whereby the GPID Board of Directors had approved specific water conservation measures and removal of Savage Rapids Dam and its replacement with pumps. At that point, GPID was required to proceed with due diligence to implement the conservation and dam removal plans; once the dam was removed and a conservation plan implemented, GPID was to obtain a water right certificate (e.g., a permanent water right) for an additional amount of water (52 cfs) (Hunter, 1998). Thus by early-1995, it appeared that the cooperative efforts between GPID, the State of Oregon, and concerned environmental organizations had paid off and a win-win resolution had been reached; GPID would receive the pumps and water it required to continue operations and the public would benefit from species conservation and revival of a once-plentiful fishery.

And the Bureau of Reclamation was even interested in funding and completing the project (Hunter, 1998).

Politics intervened however, and the cooperative efforts came under attack from a combination of local political and ideological resistance. According to Hunter (2005), much of this opposition was underestimated; opposition came from homeowners on the seasonal reservoir created by the dam, downstream riverfront property owners – who were pleased that the dam blocked boat traffic, and from misinformed irrigation district patrons who believed that dam removal would mean the end of the GPID. In addition, a series of pro-dam GPID members were elected to the District's Board of Directors and sought to garner support to keep the dam from state and national lawmakers. These pro-dam forces also embarked on an aggressive and costly political and legal campaign to "save the dam". In 1998 for example, GPID spent more than $280,000 on legal fees – out of an annual budget of $1 million – in state and federal courts on cases related mostly endangered species and water right allotments.

Prior to this, the Oregon legislature had responded to the lobbying efforts of pro-dam GPID members in 1995 and passed a bill to save the dam; the bill was quickly vetoed by then-Governor John Kitzhaber (D). Nonetheless, the Republican-controlled legislature was successful in first delaying dam removal by passing a bill (S. 1006) that created a task force to study the matter further, and second in ensuring the task force was heavily stacked with "save-the-dam" advocates (Hunter, 2005a). In effect, the 1994 order by the OWRC to remove the Savage Rapids Dam could not be implemented until the task force had completed its duties under this 1995 act. A year later, as recommended by the task force, the Oregon legislature approved a fish passage alternative that would

have left the dam in place. The following year, the Rogue River population of Coho salmon was listed as 'threatened' under the ESA and in large part, this led to a reversal of GPID's position in support of protecting the dam; GPID members soon voted to remove the Savage Rapids Dam and indicated to state and federal officials that GPID would cooperate in the removal process (Hunter, 2005a).

Perhaps unsurprisingly, GPID members voted to recall its Board of Director's Chair that same year (1997) and a pro-dam majority quickly resumed control of the Board. A year later, GPID Board members again reneged on its commitments to remove the dam and initiated a second legal and political campaign to save the dam. This was countered by OWRC's decision to file suit against GPID, seeking to have GPID's water right cancelled for its violation of the 1994 permit requiring GPID to pursue dam removal with "due diligence" GPID's campaign to save the dam also stimulated US NMFS to file an ESA "take case", alleging harm caused by the District's dam to threatened Coho salmon (Hunter, 2005a).

Throughout 1998 – 1999, ongoing settlement negotiations on the state and federal cases continued through federal court mediation. In late-1999, GPID patrons again reversed their position on the fate of Savage Rapids Dam by electing a dam removal advocate to its Board. This was followed in early-2000 with a vote to (again) to remove the dam and replace it with pumps; in this vote, sixty-three-percent of the ballots received were in favor of removal (GPID, 2002). In October 2000, federal legislation (S. 3227) was introduced by Oregon Senators Ron Wyden (D) and Gordon Smith (R) to authorize federal funding to remove Savage Rapids Dam (and replace it with pumps). Despite having bipartisan support from Oregon's congressional delegation (e.g., Congressmen

Greg Walden (R) – OR 2nd and Peter DeFazio (D) – OR 4th), no action was taken at the time on this bill prior to the close of the 2000 Congressional Session. Nonetheless, this was a significant development and would provide a framework for future agreements; the bill set forth the elements for a funding package that the nonfederal parties had agreed to support. This included agreement on authorization and funding for installation of properly screened pumps; dam removal; power assistance to GPID; sediment management; a five year warranty on the pumps; installation; riparian and fishery enhancements; and recreational enhancements (US District Court, 2001).

In August 2001, GPID's Board of Directors approved an agreement with all parties involved in the state and federal lawsuits. A key element of this Consent Decree, brokered in the US Ninth District Court, was the agreement among all parties to continue working together to fund and implement the pumping/dam removal plan outlined in the 2000 Savage Rapids Dam Act.[60] In this regard, the State of Oregon, the federal government, and a host of conservation and sport fishing interests agreed to seek reintroduction and passage of federal legislation similar to the 2000 Act. In addition, GPID was granted a certified water right for the additional 52 cfs it had requested after OWRC's 1982 survey of the District's water right.[61] It was also agreed that GPID would ultimately obtain the permits it needed for compliance with the ESA; this allowed GPID to continue operations at the dam for irrigation diversions for an interim period, with the imposition of restrictions and monitoring requirements, and to operate the pumps once installed for the full irrigation season. Lastly, it was agreed that once fully operational pumps were installed, to occur no later than the end of the 2005 irrigation season, GPID would cease operations at the dam and unconditionally allow for its

removal. GPID was subsequently granted a one-year extension, allowing for used of the dam through 2006. And lastly, all lawsuits and claims that had been filed against GPID were to be dismissed, in order to allow all of parties to focus time and resources on the pumping plan/dam removal legislation (US DC, 2001).

Subsequent to the signing of the Consent Decree, a series of events have transpired which together, have substantially increased the likelihood that Savage Rapids Dam will ultimately be removed. In January 2002, The State of Oregon Watershed Enhancement Board pledged a $3 million grant to go towards removing the dam and replacing its water delivery functions with modern pumps. In June 2003 Senators Wyden and Gordon reintroduced a slightly modified version of the 2000 bill and in August 2003, Congress voted to pass the Savage Rapids Dam Act (P.L. 108-37), thereby authorizing BOR to remove the controversial dam via implementation of the 2001 Consent Decree. NOAA Fisheries was also directed to assist with fish recovery planning. During Fiscal Years (FY) 2002 and 2003, Senators Wyden and Smith were successful in efforts to secure $750,000 in funding to facilitate the study and design of the pumping system. The President's 2005 budget request included $2 million to complete final designs for the pumps to be installed at the dam. A subsequent omnibus spending bill emerged from Congress in November 2004 with $6 million earmarked in FY2005 for selected development activities in southern Oregon; $2.2 million of the allotment was directed to fund the Bureau's inaugural construction of irrigation pumps at Savage Rapids Dam (Mail Tribune, 2004). Also in 2005, updated environmental review for the removal process was completed for the removal process and the design should be completed before year-end. For FY2006, $1.5 million was included in BOR's budget for

continuance of the dam removal process and pump installations and for FY 2007, the Senate Subcommittee on Energy and Water and Related Agencies has recommended that $13 million of the Bureau's budget be allocated towards removal of Savage Rapids Dam. This figure is the same as the allowance approved by the House Appropriations Committee (LOC, 2006; Waterwatch, 2005).[62]

Cost and Benefits of Status Quo versus Policy Change

According to the Bureau's 1995 EIS, the estimated cost of refitting Savage Rapids Dam with less-lethal and up-to-date fish-friendly technologies was $21 million. The estimate for removing the dam and updating the water pump and deliver system in order to ensure local water demands would continue to be met was $13 million. For GPID, removal of the dam and installation of modern pumps would secure its future and allow it to operate in an efficient and economically viable manner (WaterWatch, 2006).

In addition, as an output of policy change, the removal of Savage Rapids Dam is estimated to result in an additional 114,000 salmon and steelhead in the Rogue River system while restoring unimpeded access to 500 miles of prime spawning and rearing habitat for these and many other species of fish – all spring Chinook salmon spawn upstream of the dam, which impedes passage of significant portions of the four other runs of salmon and steelhead in the Rogue, including the threatened Coho salmon WaterWatch, 2006).Coho salmon alone are estimated to inject an additional $5,000,000 annually into the local economy. Opportunities for run-of-the-river boating and other recreational activities would also be enhanced on the Rogue, an upstream (and above the dam) portion of which is classified in the US National Park Service's inventory of Wild and Scenic Rivers (NPS, 2006).[63] Finally, with removal, approximately 800 cfs of water

rights associated with the dam would be converted to in-stream water rights to be used in order to help protect and sustain year round flows in the Rogue River in perpetuity (WaterWatch, 2005).

As of mid-2006, the Savage Rapids Dam removal project continued to move forward, with sustained collaboration between a consortium of conservation organizations, led by WaterWatch of Oregon (the first environmental organization in the West to focus solely on the protection and restoration of river flows) and GPID. Ultimate completion of the restoration project depends on the success of the ongoing quest to secure the necessary funds. To this end, GPID continues to work with a host of conservation organizations, the Governor's Office, and Oregon's Congressional delegation, led by Senators Wyden and Smith and Representatives DeFazio and Walden.

The current forecast is that removal and restoration efforts at Savage Rapids Dam will be completed by the end of 2008, yet substantial funding authorizations remain necessary (Hunter, 2005; WaterWatch, 2006). And while dam removal remains a top priority for many Oregon residents and state and local government officials, the Bureau remains a reluctant player and has yet to prioritize (de)construction activities at Savage Rapids to an equal (or even significant) degree. According to the Bureau's Area Manager for its Lower Columbia Area Office,

"we [the BOR] didn't even participate in the Consent Decree ... we were *invited* into the lawsuit ... but here we are now, right in the middle" (Eggers, 2005).

Notes

[1] BOR states are: AK, WA, OR, CA, AZ, NV, ID, MT, WY, UT, CO, NM, ND, SD, NB, OK, and TX.

[2] The BOR is different than other Interior Department agencies in that it operates under specific authority for each project. as the potential for additional project purposes was identified by the states and localities,

Congress supplemented the Reclamation Act to included hydropower production, flood control, municipal and industrial water, recreation, and fish and wildlife enhancement (US BOR, 2005a).

[3] Among the largest projects completed during this period by the Bureau were Hoover Dam (1935), Colorado River Aqueduct (1941), Glen Canyon Dam (1963), and the Central Arizona Project (1993).

[4] Commissioner Keys has spent his entire professional career working with Reclamation throughout the Western United States. From 1964 to 1979, he worked as a civil and hydraulic engineer in the Great Basin, the Missouri River Basin, the Colorado River Basin, and the Columbia River Basin. In 1998, he retired from federal service, having served as Pacific Northwest Regional Director for 12 years. In 1995, Keys was awarded Interior's highest honor - The Distinguished Service Award - for maintaining open lines of communication and keeping interest groups focused on solutions.
Keys received a BS in Civil Engineering from the Georgia Institute of Technology in 1964 and a Master's Degree in 1971 from Brigham Young University. He is a registered professional engineer in the states of Colorado, Wyoming, Montana, and North Dakota.

[5] The Bureau's Mid Pacific Region is divided into five additional offices. These include the Central California Area Office; the Klamath Basin Area Office; the Lahontan Basin Area Office (LBAO); the Northern California Area Office; and the South-Central California Area Office. The State of California adheres to the basic NEPA doctrine and largely follows the federal governments requirements to use all practicable means and measures to protect environmental values. Beyond this central role of NEPA in guiding the Bureau's activities in California, the region and its five offices are overseen by the Mid Pacific Construction Office. It performs design data, pre-construction and on-site construction management, and construction contract administration activities throughout the region. This includes data gathering, materials investigation and analysis, surveying, constructability reviews, engineering analysis and solution implementation, and project management. Projects include dams, fish screens, pipelines, pumping facilities, storage dams and reservoirs, fish facilities, wildlife mitigation and enhancement, temperature devices, and environmental restoration. (Source: http://www.usbr.gov/mp/mpco/index.html)

The Bureau's environmental activities in its Lower Colorado Region center on the Lower Colorado River Multi-Species Conservation Program (MSCP). This is a comprehensive, long-term multi-agency effort to conserve and recover endangered species, and protect and maintain wildlife habitat on the lower Colorado River. The MSCP's purposes are to protect the lower Colorado River environment while ensuring the certainty of existing river water and power operations, address the needs of threatened and endangered wildlife under the Endangered Species Act, and prevent the listing of additional species on the lower Colorado River.

The MSCP covers areas up to and including the full-pool elevations of Lakes Mead, Mohave and Havasu and the historical floodplain of the Colorado River from Lake Mead to the United States-Mexico boundary, a distance of about Conservation measures currently focus on the area from Hoover Dam to the border, but may include Grand Canyon in the future. The MSCP was developed between 1996 and early 2005 as a 50-year plan to create more than 8,100 acres of riparian, marsh and backwater habitat for four listed species and 16 other species native to the lower Colorado River. It also includes measures to protect and enhance an additional two listed and four non-listed species, and plans for stocking more than 1.2 million juvenile razorback sucker and bonytail to augment the existing populations of these fish in the lower Colorado River.

Implementation of the program began in April 2005 with the signing of a Record of Decision by the Secretary of the Department of the Interior. The Department will provide 50 percent of the program's estimated $626 million cost, and California, Nevada, and Arizona will jointly provide the other 50 percent (CA-50%, NV-25% and AZ-25%). The implementation activities are based on adaptive management principles, which allows program conservation measures to be adjusted over time based on monitoring and research. The BOR, in consultation and partnership with a Steering Committee made up of representatives from the 56 participating entities, is the primary implementing agency for this activity. (Source: http://www.usbr.gov/lc/lcrmscp/index.html)

The Bureau's Upper Colorado Region is responsible for managing and protecting water and associated resources including project facilities, endangered species, and many other environmental considerations. As drought continues to persist in the Upper Colorado Region and throughout the West, the challenge of fulfilling this responsibility increases, making wise management of our finite water resources imperative. Part of the Upper Colorado Region's role in addressing these challenges is to bring competing interests together to find consensus-based approaches to the contemporary water challenges in the West.

A good example of this kind of approach is the Glen Canyon Dam Adaptive Management Program (AMP). The objective of the AMP is to apply scientific knowledge gained through the program to improve the resources downstream from Glen Canyon Dam while complying with existing law. This is accomplished through the Adaptive Management Work Group, a federal advisory committee with representation from each of the cooperating agencies, Colorado River Basin states, environmental groups, recreation interests, and contractors for federal power from Glen Canyon Dam. A second example is the Upper Colorado Region's endangered species recovery programs. These programs rely on collaboration and consultation among multi-party stakeholders to develop and implement recovery strategies that comply with the Endangered Species Act of 1973, while allowing Reclamation to fulfill its mission and meet obligations under Reclamation law and water delivery contracts. (Source: http://www.usbr.gov/uc/envdocs/index.html)

The Bureau's Glen Canyon Dam provides a dramatic example of its environmental obligations regarding the river corridor within Grand Canyon National Park. In 1989, the Bureau's Lower Colorado Region was ordered by the Secretary of the Interior Lujan to prepare an EIS for its operation of the dam – with specific focus on the downstream impacts of its flow release regime. In Congress 1992 Congress authorized this project with passage of the Grand Canyon Protection Act. The final EIS was released in 1995 by the BOR and included a comprehensive account of the deleterious environmental impacts stemming from dam operations. And while the preferred alternative that was ultimately chosen resulted in only minor modifications to the dam's operations, public involvement resulted in over 33,000 written comments and the aforementioned AMP (which includes planned flooding and continued experimentation with release patterns) The AMP continues to evolve in an effort to mitigate adverse ecological impacts to the fullest extent possible (Lowry, 2004).

The Bureau's environmental activities in the Great Plains Region are administered under Environment and Cultural Resources Program. The Great Plains Region encompasses all or parts of nine states, and is the most environmentally and culturally diverse area managed by the Bureau of Reclamation. The Region has approximately 128 species listed under the Endangered Species Act, and a host of other cultural and archeological resources. The Region is divided into six additional areas, each with an area office. These include the : Dakotas Area Office (North & South Dakota); Eastern Colorado Area Office (Eastern Colorado) ; Montana Area Office (Montana, East of the Continental Divide); Nebraska-Kansas Area Office (Nebraska & Kansas); Oklahoma-Texas Area Office (Oklahoma & Texas); Platte River Office (Platte River Basin); and Wyoming Area Office (Wyoming). (Source: http://www.usbr.gov/gp/nepa/)

[6] Consider the following passage which typifies the early American conservationists' unquestioning acceptance of large-scale irrigation as a necessary conservationist task. "The essence of the industrial life which springs from irrigation is its democracy. The first great law which irrigation lays down is this: There shall be no monopoly of land. This edict it enforces by the remorseless operation of its own economy. Canals must be built before water can be conducted upon the land. This entails expense, either of money or of labor. What is expensive cannot be had for naught. Where water is the foundation of prosperity it becomes a precious thing, to be neither cheaply acquired not wantonly wasted. Like a city's provisions in a siege, it is a thing to be carefully husbanded, to be fairly distributed according to men's needs, to be wisely expended by those who receive it. For these reasons men cannot acquire as much irrigated land, even from the public domain, as they could acquire where irrigation was unnecessary. It is not only more difficult to acquire in large bodies, but yet more difficult to retain. A large farm under irrigation is a misfortune; a great farm, a calamity. Only the small farm pays. But this small farm blesses its proprietor with industrial independence and crowns him with social equality. That is democracy. Industrial independence is, in simplest terms, the guarantee of subsistence from one's own labors. It is the ability to earn a living under

conditions which admit of the smallest possible element of doubt with the least possible dependence upon others. Irrigation fully satisfies this definition. The canal is an insurance policy against loss of crops by drought, while aridity is a substantial guarantee" (Smythe 1900, 43).

[7] According to Clarke and McCool (1996), the 1862 Homestead Act was passed representatives from the Confederate states were conveniently absent.

[8] This interest exemption represents an indirect burden on the general American taxpayers and in some cases, it has amounted to a subsidy of ninety cents on the dollar (Reisner, 1993).

[9] A man and wife could jointly farm 320 acres in common property states.

[10] Since 1921, a portion of the mineral royalties derived from public lands have been used to augment the Reclamation fund (Clarke and McCool 1996, 134).

[11] Wahl (1989) estimates that the subsidy for reimbursable construction costs from 1902 to 1986 (in 1986 dollars) was between $19 and $19.7 billion. As such, roughly 86% of the total reimbursable construction costs have not and will not be repaid.

[12] The acre limitation of the 1902 Reclamation Act was central to this lengthy dispute between the ACOE and BOR over construction of the project. Private landlords owning huge plots of land initially supported the Corps' bid to build the project, as there would be no issue regarding the acreage limitation.

[13] Another scheme used to subvert the 1902 Act included the use of dummy homesteaders to obtain a patent. The land would then be transferred to a speculator (see Wahl, 1986 ; Meyers, 1966).

[14] Evidence for such a pattern emerged from a 1981 study by the BOR. It found that roughly forty-eight percent of all acres receiving its water were held by owners of 160 acres or more (Wahl, 1986). The same study revealed that corporate farms that operate on more than 960 acres each controlled more than twenty-six percent of all Reclamation-irrigated lands. Perhaps more significantly, two of the biggest BOR projects (the Colorado – Big Thompson and the Imperial Valley) continue to operate in complete exemption from both the acreage limitation and the residency requirement (Wilkinson, 1992).

[15] The Arizona state legislature did not ratify the Compact until 1944.

[16] In 1928, Arizona remained the only state opposed to the Compact. This prompted Congress to adjust its requirement that the agreement be unanimously approved and thus, the Compact was ratified with signatures of six of the seven states. Arizona's opposition was based on concern that the Colorado River had not been divided into apportionments within the lower basin states. As the population of Arizona gradually expanded throughout the late-1800s and in to the early-1900s, farmers and politicians sought for ways to channel water into the state's arid interior in order to facilitate economic expansion. This put Arizona on a collision course with California, which had already been diverting the Colorado River for a generation to irrigate the Imperial Valley. Resulting was Arizona's refusal to sign the Colorado River Compact of 1922 which involved an agreement of mass water allocation between the upper basin states and the lower basin states (i.e., NV, CA, AZ). The upper basin states insisted on reserving water for future use which they feared would be lost to the rapidly developing lower basin states, most notably California. Furthermore, Arizona leaders such as Carl Hayden ardently opposed the terms of the 1922 Compact, especially after William Mulholland, the man who seized the water of the Owens Valley for Los Angeles, announced that his city wanted 1,500 cfs of Colorado River water for its domestic supply (Reisner 1993). This "anti-compact coalition" in Arizona grew in size as the copper companies, agriculturists, and public utilities companies joined in as the perception grew that California was stealing "Arizona's river" with the full support of the federal government (Reisner 1993). Because of such opposition, ratification of the compact died in the Arizona legislature.

By 1928 however, California support had overwhelmed Arizona opposition and the Boulder Canyon Project Act was passed in the House which approved construction of Hoover Dam, a federal reclamation project perceived by Arizonans as singularly benefiting California. The following spring, six of the seven states had ratified the Colorado River Compact while Arizona continued to loose a series of water cases in the U.S. Supreme Court because of its refusal to sign the Compact.

In 1944, the Arizona legislature, recognizing that ratifying the Compact represented their only hope of eventually obtaining their own federal water project, finally voted for approval. Two years later, the Central Arizona Project (CAP) Association was formed to lobby for federal approval and funding. However, when Arizona politicians (most notably Ernest McFarland and Carl Hayden) introduced bills into Congress to authorize CAP, they encountered stiff opposition from Californians who argued that Arizona was attempting to divert water that did not belong to the state (Brown and Weatherford 1986). The differing claims were based on conflicting interpretations by the two states regarding the 1922 Compact and subsequently, Congress refused approval of CAP until the states had resolved their differences.

In 1952, Arizona filed suit once again in the U.S. Supreme Court asking for judicial apportionment of the Lower Basin's water. The subsequent trial (Arizona v. California) lasted for eleven years, required the service of a special master, and cost nearly $5 million. In June of 1963, the Court ruled in favor of Arizona by awarding Arizona all the water in its tributaries plus 2.8 million acre feet of Colorado River water. This decision gave Arizona practically everything it had unsuccessfully sought during the negotiations over the 1922 Compact (Brown and Weatherford 1987).

Predictably, California was enraged by the decision. Arizona, on the other hand, optimistically returned to Congress for authorization of CAP. The showdown between the two states would continue but this time, California was willing to bargain. In exchange for dropping their formidable congressional opposition to CAP, California demanded first priority for its apportionment of 4.4 million acre feet. Arizonans reluctantly acquiesced and therefore, "the CAP legislation became saddled with what is know as the California Guarantee: 4.4 million acre-feet or bust; come drought, come calamity, California must be satisfied first" (Reisner 1993, 295). Further, Arizona had to pacify more than just California as concerns about the over-allocation of the Colorado River spread to the Upper Basin. As water supply estimates were recalculated (resulting in rather substantial reductions for the most part), Upper Basin states and other western legislators agreed to support the CAP legislation only in exchange for their own project authorizations.

[17] Because of its location, the dam was initially referred to as Boulder Canyon, yet the dam site was actually moved to a different impoundment site in Black Canyon. A Congressional Act of February 14, 1931, changed this and made the name "Hoover Dam" official. In 1932, Hoover lost his bid for reelection to Franklin Delano Roosevelt and his new Secretary of Interior, Harold Ickes, promptly removed Hoover's name from all references to the dam. with him to replace Ray Lyman Wilbur as Secretary of the Interior. Ickes wasted no time removing Hoover's name from the Boulder and sought to have it officially referred to as Boulder Dam. On April 30, 1947, President Harry S. Truman signed Public Law 43 which read: "Resolved ... that the name of Hoover Dam is hereby restored to the dam on the Colorado River in Black Canyon constructed under the authority of the Boulder Canyon Project Act ... . Any law, regulation, document, or record of the United States in which such dam is designated or referred to under the name of Boulder Dam shall be held to refer to such dam under and by the name of Hoover Dam."

[18] The 726-foot high Hoover Dam was nearly twice as high as any existing dam and the reservoir it created was eight times larger than the lower Aswan in Egypt. The associated All-American Canal came to irrigate over a million acres in California and the canal's total excavation was a fourth of that of the Panama Canal (Kollgaard and Chadwick, 1988).

[19] This agency operated simultaneously as both the Civil Works Administration and the Works Progress Administration. Together, these three entities (intermittently under the umbrella of a single agency) would construct a dizzying array of public works. See Reisner 1993, 146-147.

[20] Six Companies, Inc. was the contracting firm that was formed to build Hoover Dam and later went on to build Grand Coulee Dam and other large BOR projects. The companies included: Morrison Knudsen of Boise, ID; Utah Construction of Ogden, UT; Pacific Bridge Company of Portland, OR; Bechtel Corporation of San Francisco, CA; Kaiser of Oakland, CA; and MacDonald-Kahn of Los Angeles, CA

[21] Shasta Dam required twice the volume of concrete as Hoover Dam, and Grand Coulee is far greater in length (at 5,223 ft.) than Hoover Dam (1,244 ft.) (McCully, 1996; US BOR, 2005).

[22] At Grand Coulee Dam, two generators were dedicated to the production of this highly energy-intensive component of the first nuclear weapons.

[23] An omnibus spending bill is a bill that sets the budget of many departments of the United States government at once. Ordinarily, individual bills are passed separately in distinct policy domains (e.g., one bill for Defense, one for agriculture, one for education, etc. Yet when Congress does not or cannot produce separate bills in a timely fashion (by the beginning of the fiscal year on October 1), it may roll many of the separate appropriations bills into one omnibus spending bill. Omnibus spending bills are frequently criticized for being full of pork and they commonly exceed 1,000 pages in length, and often have not even been read in full by the people voting for them. Nevertheless, they have grown more common in recent years.

[24] The following rivers and river basins were the subject of this report; the Rio Grande, Colorado, Missouri, Arkansas-White-Red Rivers Basin, and the Columbia. See Report of the President's Water Resource Policy Commission, Vol. II, Ten Rivers in America's Future. 1950. Washington, DC: Government Printing Office.

[25] Construction of the CVP initiated a long-term plan for the use of the water of the Sacramento River basin in the north for the benefit of the San Francisco Bay Area, the farmlands of the San Joaquin Valley, and other metropolitan areas in the south. The Project involves a system of four major dams, multitudes of smaller storage of diversion structures, and hundreds of miles of canals and aqueducts.

[26] Bidding opened for construction of Grand Coulee Dam on June 18, 1934 and the structure was completed in 1942.

[27] The Corps' program primarily deals with major main-stem reservoirs and flood control projects. The Bureau cooperates with the Corps and other agencies in the joint coordinated plan of conservation, control, and use of the basin's water resources. Cooperating agencies within the Department of the Interior, in addition to the Bureau of Reclamation, include the Bureau of Land Management, Bureau of Mines, Fish and Wildlife Service, Geological Survey, National Park Service, Bureau of Indian Affairs, and the Office of Water Research.

[28] On December 22, 1944, the President signed the Flood Control Act of 1944, Public Law 534, 78th Congress, 2d session, which approved the coordinated plan and authorized appropriations to each of the two agencies for construction of the initial stages. The Flood Control Act of 1946, approved July 24, 1946, authorized additional appropriations to the Department of the Interior for the further development of the comprehensive plan adopted by the Flood Control Act of 1944. This act extended the authorization to all units of the plan in addition to the initial stage authorized in the 1944 act. Further appropriations have provided for the continued development of the program.

[29] The Central Arizona Project (CAP) is a series of dams, pumps, and canals transporting Colorado River water 335 miles uphill from the Arizona-California border to Phoenix, Tucson, and the agricultural districts and numerous Indian reservations located in the state's arid south-central interior.

[30] For a detailed account of the ascendancy and domination of the Los Angeles City Water Company and the Los Angeles Department of Water and Power, see: Worster (1985); Reisner (1993); Wilkinson (1992).

[31] The only real political and public opposition to the Bureau during this time came from southern California, which was wary of the 160-limit, and from Illinois Senator Paul Douglas, who was targeted the Reclamation program as the worst perversion of the New Deal ideas (Reisner 1993, 141).

[32] According to Worster (1985), the federal government's role in promoting water development has led to the creation of a modern "hydraulic society". In the American West, the federal support was manifest primarily through the activities of the BOR and thus, the agency is largely responsible for the emergency of this form of social order. Specifically, this hydraulic society is said to represent a centralized social order based on the intensive, large-scale manipulation of water and its products in arid settings (Worster 1985). Moreover, it is argued that this social order which came to govern the western water community is devoid of self- defining, self-managing individuals and districts. Rather, it is a system characterized by a coercive, monolithic, and hierarchical techno-economic suborder ruled by a formidable alliance comprised of two centers of power (i.e., private agricultural capitalists and a public sector of bureaucrats and elected representatives). As a result, the social order of the western water community is portrayed as one of disorder; marked by lack of social justice and a federal government that operates as an undemocratic "agency of power", committed not only to conquering the natural world, but in the process, to controlling the local destinies of communities throughout the West (Worster, 1985).

[33] Eighty-five cents of every dollar spent on irrigation features by the Bureau would be subsidized by power revenues (Reisner, 1993). The subsidies would be worth as much as $2 million per farm, perhaps five times as much as the farms themselves were worth (Reisner, 1993).

[34] Dominy is the subject of two influential books focusing on water in the West, Marc Reisner's Cadillac Desert and John McPhee's Encounters with the Archdruid. Born in 1909 and raised on a Nebraska farm, Dominy grew up realizing the importance of irrigation west of the hundredth meridian. He received his Bachelor of Arts degree in Agricultural Economics from the University of Wyoming in 1932. After college, Dominy worked as a teacher, agricultural agent and Assistant Director of the Food Supply Division. He joined Reclamation in 1946 as a land settlement specialist. He supervised the Allocations and Repayment Branch, Division of Irrigation between 1950 and 1957. Dominy rose to Assistant Commissioner from 1957 to 1958, and eventually assumed the Associate Commissioner's job from 1958 to 1959. Dominy took control of the Commissioner's office on May 1, 1959, by literally forcing the sitting Commissioner Wilbur Dexheimer from office..

[35] In Encounters with the Archdruid, John McPhee describes David Brower as an Archdruid, a characterization given to all conservationists that act religious figures and who sacrifice people and worship trees.

[36] The Bureau had actually begun initial construction of the first dam in the early 1960s (Marble Canyon Dam located roughly fifty miles downriver from Glen Canyon) and since then, Congressional Representatives from Arizona have attempted virtually every year to revive the proposal to construct the second dam (Bridge Canyon Dam located roughly 250 miles downriver from Glen Canyon) (Stevens, 1983).

[37] Upon learning that Secretary of the Interior Udall had dropped the two Grand Canyon dams from the CRSP, Dominy responded with the following, "My Secretary turned chickenshit on me. The man was blind. He went completely blind" (Reisner 1993, 253).

[38] For example, none of the following were ever authorized or constructed: Devil's Canyon Dam on the Susitna River; the Texas Water Plan, Auburn Dam on the American River; additional dams in Hells Canyon on the Snake River; the Oahe and Garrison diversion projects in the Missouri Basin; and the Animas-La Plata project (as originally devised) in southern Colorado (Reisner 1993, 253).

[39] Most significantly, the massive Rampart Dam in Alaska initially proposed by the ACOE was deleted from further consideration. The proposal engendered bitter controversy between the Bureau and the Corps and according to Reisner (1993), neither agency had any legitimate business planning projects in Alaska –

where there is virtually no irrigated agriculture, few navigable rivers, little concern for urban flooding, and nothing resembling a water shortage (207-212). In addition, the plan was unprecedented in scope; Rampart Dam would create the largest reservoir on earth (roughly the size of Lake Erie) and have the capacity to produce two and a half times more hydroelectricity (five million kilowatts) than the initial output of Grand Coulee Dam.

[40] Resultant BOR publications would go on to include chapters on power generation and "The Environmental Crisis" (Lamb, 2004).

[41] The last completed major project of BOR, CAP is a series of dams, pumps, and canals transporting Colorado River water 335 miles uphill from the Arizona-California border to Phoenix, Tucson, and the agricultural districts and numerous Indian reservations located in the state's arid south-central interior.

[42] Worster's instrumental reason describes a problem-solving mentality whereby careful thought is given towards effective and efficient means, while the problem of ends is ignored.

[43] The proposed alternatives in the final EIS included weather manipulation via cloud seeding, desalinization of ocean water, watershed management through the elimination of forests and replacement of vegetation to enhance runoff, and the diversion of water from the Northwest (Espeland, 1998).

[44] Clarke and McCool (1996) posit three types of categories to explain the differentials in power and success among executive bureaucracies involved with civil works, public lands, and/or natural resource management activities. The first is labeled "bureaucratic superstars", which is used to describe the US ACOE and US Forest Service as the most powerful and successful agencies. These agencies are discussed as the best equipped to make the necessary changes to secure their continued influence – primarily due to the presence of a potent combination of factors. These include: "a pro-development, multi-use mission; a pragmatic or utilitarian ideology; a clear beginning (through a direct congressional statement of purpose at the time of its creation, or through the work of a strong founder, or ideally both; a scientific and/or military basis of expertise; a coherent, well-defined public image; and unusually strong support from Congress)or sometimes from the chief executive) as well as from large, well-organized constituencies outside the formal institutions of government" (66-67).

The second is labeled "agencies that muddle through", which is used to describe the National Park Service, the Natural Resources and Conservation Service, and the US Fish and Wildlife Service. These agencies are discussed as agencies that have achieved somewhat of a solid niche in the bureaucratic environment yet have failed to develop to their fullest potential. The conditions that define this category include: the nature of the agency's original mission (i.e., it is often dichotomous, with conflicting goals); the professional base of the organization (i.e., it is often highly interdisciplinary, without the predominance of a single profession); and the nature of the agency's constituency (i.e., it is often limited by an original mission and defined by a more contemporary base).

The third is labeled "organizational shooting stars", which is used to describe the BOR and US Bureau of Land Management. These agencies are discussed as having variegated histories, with rapid and erratic periods of growth. Moreover, their missions and support bases are limited by region and while they have exhibited dramatic instances of organizational growth, their futures remain precarious.

[45] The Pacific Northwest actually turned out to be the Corps' most fertile area for water resources development (Clarke and McCool, 1996).

[46] Ironically, Church is remembered for his voting record as a strong liberal and environmental legislator. He played a major role in the creation of the nation's system of protected wilderness areas in the 1960s, which was all the more remarkable considering that he represented one of the most Republican states in the nation. He was also instrumental in the creation of Idaho's River of No Return Wilderness in 1980, which was renamed the Frank Church-River of No Return Wilderness in 1984, shortly before his death.

[47] Interestingly then-governor of Idaho, Cecil Andrus, refused to offer outright support the project. His later record on water projects as US Secretary of the Interior suggest that he most likely thought the Teton Dam was a terrible idea.

[48] Ironically, the ACOE's budget was actually raised by twenty-four percent during this same 4-year period (Clarke and McCool, 1996).

[49] The Bureau's first Public Involvement Manual declared, "management of our finite water resources will continue to change as our Nation's economic, social, and environmental priorities change" (Creighton, 1981).

[50] Roughly two years after this reorganization, a GAO investigation found that the Bureau had experienced a decline in efficiency an increase in costs as a result of the reorganization (Clarke and McCool 1996, 146).

[51] Statement given by Commissioner Beard to engineers gathered at the 1994 Congress of the International Commission on Large Dams in Durban, South Africa.

[52] Beard's early career included urban renewal planning, environmental policy study and teaching. Beard worked for Congressman Sidney Yates (D-Ill.) on the House Interior and Related Agencies Appropriations Subcommittee from 1975 to 1976. He served as Deputy Assistant Secretary of the Interior for Land and Water Resources from 1977 to 1980. Beard acted as Staff Director of House Interior Subcommittee on Water and Power from 1985 to 1990 (US BOR, 2005e).

[53] A potent example of the Bureau's involvement in inter-basin water transfers is the much beleaguered and embattled Animas – La Plata project in the four-corners region of the American Southwest. Originally approved in the multi-billion dollar Colorado River Basin Project Act of 1968 (which represents the last major water development legislation for the Southwest), the Animas – La Plata project has been subject to a continual process of debate, revision, and reformulation. As such, the project has yet to be completed and currently exists in a heavily revised and scaled-back form. This uncertain status of the project is clearly related to the post-NEPA political landscape (as well as the resurgence of reserved water rights for Native American tribes) and further, it may be partially an outcome of the internal turmoil and/or transformation of the once dominant and politically viable cultural ethos of the agency. If Beard's successor at Reclamation sheds any light on this issue, it is worth noting that while no formal direction has been issued, he enthusiastically supported the project while state engineer of New Mexico.

[54] When asked about the environmental community and others that might be somewhat critical of the Bureau, Commissioner Keys commented the following. "We're a conservation agency. Some folks might not agree with that, but we do a lot of conservation work. If you look at the history of the Bureau over the last 50, 60 years, the environmental ideas, environmental opinions have changed the way we work. And I think in most cases, it's been for the good. All of the endangered species work, a lot of the accommodations for fish and wildlife, for recreation and so forth, came about as part of that input from those folks" (Water Education Foundation, 2002).

[55] $17.5 million of the FY 2005 budget request is for the continued implementation of the Columbia and Snake River Federal Columbia River Power System Endangered Species Act. This represents the alternative management regime that includes measures contained in the two Biological Opinions issued in December 2000 by the NOAA Fisheries and USFWS (US BOR, 2004).

[56] There is some confusion as to whether the BOR "owns" the Savage Rapids Dam. The original structure was built by the Grants Pass Irrigation District (Oregon) with private funds. However, for the purposes of this research, Savage Rapids represents the closest case of dam removal in the BOR context; the dam and diversion structures were almost entirely rebuilt by the Bureau, beginning in 1949. Since then, BOR has been the primary federal agency involved in repair and maintenance work and completed an EIS in 1995. BOR recommended dam removal and installation of pumps as the cheapest and most beneficial alternative

for solving the fish passage issues at the dam. In addition, federal legislation was passed in December 2003, authorizing the Bureau to install pumps and remove the dam (P.L. 108 -137).

Nonetheless, according to the Bureau's website, it does "own" the dam, which it lists as "managed by GPID. The following was directly copied from BOR's Savage Rapids Dam website, http://www.usbr.gov/dataweb/dams/or00290.htm

Owner: Bureau of Reclamation, Lower Columbia Area Office,
825 NE Multnomah Street, Suite 1110, Portland, OR 97232-2135, (503) 872-2795

Operator: Grants Pass Irrigation District,
200 Fruitdale Drive, Grants Pass, OR 97527-5268, (541) 476-2582

[57] Outside the Columbia River, the Rogue River is the most productive salmon river in the State of Oregon. The Oregon Department of Fish and Wildlife has indicated that the Rogue River Basin supports the largest population of anadromous salmonids in Oregon, including spring and fall Chinook, Coho, and summer and winder steelhead trout (Hunter, 1998).

[58] Senator Brady Adams (R) – Grants Pass, OR.

[59] On December 16, 1949, GPID entered into a $100,000 contract with the United States (at no interest) for reconstruction by the Bureau of Reclamation of the northwest pipeline. Repayment was based on forty equal annual installments of $2,500 each. Specifically, the Bureau replaced the original steel suspended pipeline, which crossed the Rogue in Grants Pass, OR, with a concrete pop siphon underneath the river's bed.

Other major items of reconstruction, rehabilitation, or repair included the dam itself; the fish protective facilities at the dam; and revetment work at locations below the dam (GPID, 2002).

[60] The lead Plaintiff was the United States. Plaintiff-Intervenors included Waterwatch of Oregon; Trout Unlimited; Pacific Coast Federation of Fishermen Association; Institute of Fisheries Resources, Klamath Forest Alliance; Oregon Natural Resources Council; Siskiyou Regional Education Project; Sierra Club; Northcoast Environmental Center; Curry County Guides Association; and Northwest Sportfishing Industries Association. The Plaintiff-Intervenor-Applicants was the State of Oregon, by and through the State of Oregon Water Resources Commission. The Defendant was GPID.

[61] GPID's inefficient water delivery system (e.g., leaking pipelines, unlined canals, etc) needed the additional water among in order to offset losses. Without this settlement, GPID would otherwise have stood to lose this water permanently in 2001.

[62] The Bureau's estimated 2007 budget is approximately $40.16 billion dollars (LOC, 2006).

[63] The upper Rogue River was classified on October 28, 1988. This reach of the river flows from the Crater Lake National Park boundary downstream to the Rogue River National Forest boundary; 6.1 miles are classified as Wild and 34.2 miles are classified as Scenic for a total of 40.3 miles (NPS, 2006).

CHAPTER 6

"Numerous analysts have concluded that in spite of [its] *environmental obligations, the Federal Energy Regulatory Commission has failed to meet its responsibilities in this area, promoting hydroelectric power as superior to its other statutory duties"* – Born et al. 1998, 20.[1]

Introduction

The preceding chapters examined the two primary executive agencies that have been active in the construction of federal dams and related water projects for the majority of the nation's history. By engaging in a host of civil works-related projects, the ACOE and later the BOR – as well as their constituent bases – lobbied Congress for appropriations and when successful, proceeded to initiate construction activities. Indeed the two agencies competed and during the heyday of dam construction, each received sufficient appropriations to pursue a host of water development endeavors. While the thousands of related projects remain publicly owned, each has inherently come to represent the de facto or assumed property of either the Corps or the Bureau. And while engineers from these two agencies constructed the largest and most prolific dams in America, the federal government in reality owns a mere three percent of the 75,000-odd dams listed in the National Inventory of Dams (Grossman, 2002). This leaves a large number that are owned and operated by nonfederal public utilities or private interests.[2] Many of these have come under the primary jurisdiction of a third federal agency – the Federal Energy Regulatory Commission (FERC). In fact, FERC currently regulates more than 1,700 nonfederal dams and is responsible for dam safety at over 2,600 licensed and exempted dams and related water retention structures (FERC, 2005).

This chapter presents a broad overview of the hydropower licensing activities of the US Federal Energy Regulatory Commission (FERC / Commission). It begins with a brief discussion of the Commission today, in terms of its organization, activities, and mission. The next section considers the federal role in energy regulation and offers a brief organizational history. This includes discussion over how the federal role has been reorganized and deregulated in certain aspects. Discussion is then focused on the role of FERC in hydropower licensing and the required procedures for applicants to obtain a new license, apply for renewal, and apply for license exemptions. Following sections each examine a main component of the continually evolving hydropower licensing process. Specific attention is directed towards amendments to FERC's operating law, the Federal Power Act (FPA); the role of environmental concerns and related mandates in prompting the transformation of FERC's regulatory regime; and the role of economic valuation and consideration of market and nonmarket values in relicensing decisions.

FERC hydropower licensing is then examined in the larger context of federal environmental regulation with specific discussion on the multifaceted administrative and statutory landscape in which FERC currently operates. The intersection of dam removal policies and FERC relicensing is then assessed, with specific attention given to a host of precedent-setting FERC rulings and how subsequent decisions to remove dams have diffused across the country. The chapter closes by considering the impact of recent reforms on procedures related to FERC relicensing and a brief consideration of what the near future may hold for dam removal and river restoration since an unprecedented number of operating licenses are set to expire over the next two decades. In conclusion,

the recent decision to remove the Milltown Dam, situated on western Montana's Clark Fork River, is described in the political and jurisdictional context of the FERC.

I. US Federal Energy Regulatory Commission

FERC Today

Unlike the ACOE and BOR, the Commission is an independent regulatory agency within the Department of Energy. At the broadest level, it monitors the nation's energy markets through regulation of the interstate transmission of electricity, natural gas, and oil.[3] For the purposes of this dissertation, the regulatory role of FERC in regards to dams with hydropower generating capacities is the primary focus.

The contemporary FERC has jurisdiction over virtually all non-federal hydropower dams in the US. Specifically, this jurisdiction extends to all dams which meet at least one of the following criteria: occupies federal public land or federal reservation(s); located on a navigable stream, or a non-navigable stream which affects interstate or foreign commerce (including providing power to an interstate power grid); uses surplus water or water power from a federal dam; and/or was constructed after August 26th, 1935 (HRC, 2005). This jurisdiction also includes any dam that, in addition to electrical generation, serves other functions such as water supply or flood control.

In order to determine whether a project falls under the jurisdiction of FERC, Section 23(b)(1) of the Federal Power Act (FPA) requires that owners either file a hydropower license application for a proposed project or file a Declaration of Intention with the Commission to determine if the proposed project requires licensing (FERC, 2005a).[4] By the end of 2005, there existed 1,016 current FERC hydropower licenses across the US; with the exception of Delaware, Mississippi, North and South Dakota, and

Hawaii (FERC, 2005). This number of FERC licenses represents roughly ninety-six percent of the privately and publicly (non-federal) owned projects; which together account for roughly fifty-six percent of the nation's total hydroelectric generating capacity (FERC, 2005a). States with the greatest number of FERC-regulated hydroelectric projects are Washington, California, and Oregon.

At the broadest level, FERC is housed under the jurisdiction of the US Department of Energy and is headquartered in Washington, DC. The Commission also has five regional offices located in Atlanta, Chicago, New York, Portland, and San Francisco. Organizationally, FERC is headed by a maximum of five commissioners who are appointed by the President and serve with the advice and consent of the US Senate. Commissioners serve five-year terms and have an equal vote on regulatory matters. One member of the Commission is designated by the President to serve as Chair and by extension, FERC's administrative head. Then current FERC Commissioner is Joseph T. Kelliher, who was appointed by President G.W. Bush on June 30, 2005. As of December 2005, there existed two vacancies on the five-member Commission.

In order to mitigate the possibility of undue political influence or pressure, no more than three commissioners may belong to the same political party (FERC, 2005). In addition, there exists no review of FERC decisions by the President or Congress. This serves to both maintain FERC's independence as a regulatory agency and provide for fair and unbiased decisions (FERC, 2005). Regarding its budget, the Commission is funded primarily through costs recovered by the fees and annual charges from the industries it regulates. In this sense, FERC is largely self-funded.

In addition to the five-member Commission, specific FERC functions are divided among eight offices (FERC, 2005c). The Office of Administrative Law Judges is chiefly responsible for the resolution of contested cases, as directed by the Commission, through either impartial hearings and decision or negotiated settlement. Similarly, the Office of Administrative Litigation is charged with the resolution of cases set for hearing through litigation. In addition, it serves to represent the public interest and to litigate or settle cases while ensuring the outcomes are consistent with FERC policy. The Office of External Affairs is responsible for all external communications for the Commission with the public and/or media. The Office of the Executive Director serves to provide administrative support services to the Commission; including human resources, procurement, information technology, organizational management, financial, and logistics. The Office of Energy Projects is primarily responsible for fostering economic and environmental benefits for the nation through the approval and oversight of hydroelectric and natural gas energy projects that are in the public interest. The Office of the General Council is charged with providing legal services to the Commission; primarily in the form of representation before the courts and Congress. The Office of Market Oversight and Investigations is charged with monitoring and assessing the operations of the nation's gas, oil pipeline, and electricity markets. And lastly, the Office of Markets, Tariffs, and Rates deals with its three namesake areas as they relate to electric, natural gas, and oil pipeline facilities and services.

II. A Brief History of Federal Power Regulation

The origins of FERC can be traced to 1920, when Congress established the Federal Power Commission (FPC) to coordinate hydroelectric projects under federal

control. The FPC was placed under the joint administration of the Secretaries of War, Interior, and Agriculture. It was limited to the employment of an Executive Secretary, while all other personnel were "borrowed" from the aforementioned three executive departments (FERC, 2005b). This organizational structure led to conflicting mandates and prohibited the formulation of a consistent national energy policy (FERC, 2005b). In response, Congress appropriated funds in 1928 to enable the FPC to permanently hire its previously borrowed staff. In 1930, passage of the Federal Power Act (FPA) established a five-member, bipartisan commission to manage the FPC's activities and operations.

Electricity and Natural Gas

A series of subsequent Congressional actions and court decisions led to an expanded mission for the FPC. For example, the FPA of 1935 and the Natural Gas Act (NGA) of 1938 gave the FPC primary authority to regulate the sale and transportation of electricity and natural gas. Subsequent amendments in 1940 to the NGA enabled the FPC to certify and regulate natural gas facilities (FERC, 2005b). In following decades, a succession of court cases further augmented the FPC's jurisdictional authority.[5] For example, it was granted jurisdiction in 1954 for facilities that produced natural gas sold in interstate commerce and in 1964, the FPC's jurisdiction came to include the intrastate sale of power that had been transmitted across state lines. In 1967 this was further expanded to intrastate utilities that had supply lines connected to others outside the state (FERC, 2005b).

Resulting from this expanded jurisdiction, the FPC was faced with a tremendous backlog of applications for natural gas permits. During the same time, it was common for regional brownouts to occur. (FERC, 2005b). Compounding the situation was the

national energy crisis and related OPEC oil embargo during the 1970s. Together, these conditions prompted calls for the bureaucratic reorganization of the FPC.

Reorganization and Deregulation

Congress took action in 1977 by reorganizing the FPC as FERC. The responsibilities of the new Commission would continue to expand as policies were developed to promote more steam-lined approval procedures and reduce direct utility oversight. The reorganization of FERC and a host of new (deregulatory) policy proposals were part of a larger political effort to enhance the nation's energy self-sufficiency (FERC, 2005b).

By the late 1970s, a number of policies were in the works to provide for gradual deregulation of the nation's energy sector. Regarding natural gas, the 1978 National Energy Act unified intrastate and interstate gas markets under the jurisdiction of FERC. In 1985 FERC ordered that natural gas pipelines provide open access to transportation services to enable consumers to negotiate prices directly with producers and contract separately for transportation (FERC, 2005b). In addition, FERC ordered its "Restructuring Rule" in 1992, which mandated the "unbundling" of sales services from transportation services and sought to provide customers with a full choice of providers in open, competitive markets (FERC, 2005b).[6] According to the Commission's own words, "deregulation [has] allowed consumers to negotiate the best terms for supply and transportation of natural gas to markets ... production has increased and gas usage is increasing" (FERC, 2005b).

Hydropower Licensing

Because rivers are considered publicly-owned resources in the U.S., they cannot be owned outright by private industries.[7] However, nonfederal utilities and private developers may obtain a license from FERC to dam a river for the purpose of hydropower generation. Original licenses commonly last fifty years and specify how a dam and its hydropower plant are to be operated. Included is the requirement that the entire project be properly maintained and operated safely (NHA, 2006). A license's term is also generally long enough for the project's owner(s) to recover initial economic investments.

Yet because the opportunity to produce private hydropower through development of a public resource represents a privilege, hydro dam owners are subject to government regulation to ensure that their operations protect the public interest and accommodate multiple uses of a given river. In the context of environmental protection, FERC licenses therefore stipulate minimum requirements for water flow and release levels; required means of fish passage; and in some cases, management regimes for watershed lands are expressed (NHA, 2006). However, since the majority of FERC hydropower licenses were granted prior to or in the nascent stages of the modern environmental movement, environmental requirements of considerable degree have come to be more relevant and applicable to the FERC relicensing process. In addition, the clear majority of FERC's activity in hydropower regulation relates to the relicensing process, since requests for license renewal now greatly outnumber applications for new projects (FERC, 2005).

Prior to July 2005, there existed three general ways through which an applicant could obtain an operating license from FERC. The first of these, the traditional licensing

process (TLP), was made obsolete after a two-year waiting period by amendments to the FPA in 2003. The TLP consisted of three stages. The first involved a series of interactions among the applicant, resource agencies, affected Native American tribes, and the public, whereby initial information about the project was shared and all interested parties were informed of the license request. The second stage involved the applicant's distribution of the draft application to resource agencies; along with a written request for their review and comment. The third stage would then be initiated with the filing of the final application with the Commission.

The second method to obtain a license, the alternative licensing process (ALP), involves the same regulatory requirements, yet in a differing sequence. Specifically, the ALP differs by providing an applicant the opportunity to conduct scoping during the pre-filing consultation and to substitute a preliminary draft of an environmental assessment (EA) or environmental impact statement (EIS) prepared by a third-party contractor. In addition, an applicant must request and receive FERC approval to use this alternative procedure when filing an application for an original license or renewal thereof.

The third method was announced by FERC in July 2003 and has since become the default for all new and renewal license requests. In this integrated licensing process (ILP), the pre-filing consultation of a potential license applicant and FERC's scoping processes pursuant to NEPA are conducted concurrently, as opposed to sequentially (FERC, 2003). The purpose of the changes was to streamline the licensing process and promote greater coordination among the Commission and federal and state agencies with conditioning authority (FERC, 2003).

License Exemptions

FERC has had the authority since the 1992 Energy Policies Act to grant exemptions from its hydropower licensing requirements in two types of cases involving so-called "exempt wholesale producers". [8] First, there are three types of small hydropower projects (i.e., 5 megawatts or less) that may qualify for an exemption (FERC, 2005d). These include projects to be built at an existing dam; projects that utilize a natural water feature for head pressure; or existing projects that have a capacity of 5 megawatts or less and proposes to increase capacity. Regarding environmental controls, exemption orders of this type are commonly supported by an EA but seldom require an EIS (FERC, 2004).

Second, FERC may authorize so-called "conduit exemptions" for generating capacities of 15 megawatts or less for private projects, and 40 megawatts or less for municipal projects. Specifically, the conduit has to have been constructed primarily for purposes other than power production and be located entirely on non-federal lands (FERC, 2005d). Exemption orders of this type are categorically exempt from the requirement to prepare an EA or EIS (FERC, 2004).

Relicensing

Prior to the expiration of a license (at least five years in advance), the licensee is required to file a notice with FERC stating the intention to seek renewal. [9] The Commission will then publish a statement of the licensee's intent to file in the Federal Register and local newspapers. The licensee is generally obliged to prepare an initial consultation package which outlines the overall project and relicensing plans. A host of public laws require that the licensee consult with relevant state and federal regulatory and

resource agencies regarding the operations needed to protect fish, wildlife, and water quality, while providing enhancements to recreation (US FWS, 1998). These records, including information on the project's power generation, financing, and environmental effects, are made available for public inspection.

According to a recent estimate, structures accounting for two-thirds of the nation's non-federal hydropower generating capacity will be subject to FERC relicensing during the next fifteen years (NHA, 2006). Renewed licenses are typically issued for a period between thirty and forty years, depending on the extent of (any) proposed new development and/or the presence of newly-required environmental mitigation and enhancement controls.

In conjunction with the relevant government agencies, conservation groups, and concerned individuals, FERC staffers will review a renewal application and identify any additional studies deemed necessary. Regulatory and resource agencies and the public are entitled to submit requests for additional information to FERC. Ultimately, FERC will review the information requests and determine which will be submitted to the applicant. Pending completion of such necessary studies on behalf of the applicant, FERC will publish in the Federal Register and local newspapers a notice that the application for a license renewal is complete and accepted by the Commission for review. This status is termed "ready for environmental analysis"(American Rivers, 2001).

At this point and for most hydropower projects, the aforementioned environmental review, including preparation of either an EA or EIS, is initiated. Based on the environmental review, FERC designates a preferred alternative. Further, a draft of either the EA or EIS is publicly distributed by the Commission. Concerned citizens,

interest groups, and appropriate resource agencies are entitled to submit their comments on the document to FERC. Based on these, the Commission then revises the draft document and issues a final report. Once the final EA or EIS is completed, FERC may hold a hearing if there are any material or factual questions remaining to be answered. Ultimately, FERC staff will make its decision on the license renewal. A recent study found that the average time it takes for FERC to issue a license after initially declaring a project "ready for environmental analysis" is approximately two-and-a-half years (HRC, 2001).

If the license applicant and/or an intervening party are not satisfied with any component of the license decision, they may request a review of the decision by the five FERC Commissioners; who can affirm, reverse, or modify the decision of its staff. If the licensee or intervening party continues to be displeased with the decision, that decision can be appealed to the U.S. Court of Appeals, and perhaps ultimately to the U.S. Supreme Court.

In addition to providing opportunities at various stages of the relicensing process, federal statutes such as the FPA and NEPA allow individuals, public interest groups, and other interested parties to provide further input into the relicensing process (American Rivers, 2000). Because FERC provides a primarily judicial function in deciding whether or not to issue a license and what new terms to impose on a relicensed project, public participation in the Commission's decisionmaking process is governed by formal, court-like rules (American Rivers, 2000). In order to participate in a relicensing procedure, intervening bodies are required to become an official party to the Commission's proceeding by filing a "motion to intervene". If a person, group, or agency does not

formally intervene, they are still entitled to file comments on a relicensing, but their comments are given more consideration if they formally intervene. Perhaps more importantly, without intervening, these individuals or groups will not have legal standing to seek judicial review of the Commission's decision (American Rivers, 2000).

It is clear that the licensing process for hydropower dams is inherently complex, involving multiple stakeholders with differing agendas. By necessity, this process is often lengthy. An additional source of complexity is that the majority of dams currently seeking license renewal were licensed prior to the enactment of most modern environmental laws such as the Clean Water Act (CWA) and the Endangered Species Act (ESA), and during a time when there was little understanding of the impacts of dams on rivers. Furthermore, hydropower remains unlike most other electricity-generating technologies since it has no "end of pipe" standards to ensure that a dam's operations do not unduly degrade the environment (HRC, 2001). Together, these factors exemplify the significance of the FERC relicensing process as a once-in-a-lifetime opportunity to review a dam's environmental impact and reevaluate its logic and utility relative to both market and non-market considerations.

The Electric Consumers Protection Act – 1986

A 1986 amendment to FERC's operating law requires that it take a more balanced and comprehensive approach to the process of dam licensing and relicensing. [10] Known as the Electric Consumers Protection Act (ECPA), this was the first significant amendment to the hydro licensing provisions of the FPA since 1935 and represents a substantial increase in FERC's enforcement powers (Muchow and Mogel, 1996). According to Kerwin (1990), passage of the ECPA represented the culmination of the

environmental community's legislative efforts. Specifically, the amendment states that when deciding whether to issue a license (or renewal), the Commission is required to give the following.

"[It must provide] equal consideration to energy conservation, fish and wildlife protection, recreational opportunities, and environmental quality".

As such, the amended licensing process provides a legitimate opportunity for the public and government agencies alike to force (at the minimum) procedural consideration of environmental impacts and/or the option of dam removal on behalf of FERC.

The 1986 "equal consideration" mandate requires FERC to consult with federal, state, and local resource agencies (including fish, wildlife, recreation, and land management agencies) in order to assess more comprehensively the impact of a hydro-dam on the surrounding environment. Specifically, FERC is commanded to ensure that

"licenses be granted upon the condition that the project adopted shall, in the judgment of the Commission, be the one best adapted to a comprehensive plan which encompasses fish and wildlife protection (including spawning grounds and habitat); and irrigation, flood control and water supply".

Furthermore, the Commission is required to "consider when making such judgment, the

"extent to which a project is consistent with a comprehensive plan for waterways; the recommendations of the governmental agencies; the recommendations of Indian tribes affect by the project; and the electricity consumption efficiency improvement program of specified applicants" (Public Law 99-495).

Together, these requirements have greatly expanded the role of state and federal fish and wildlife agencies by mandating that FERC licensees address their conditions for the protection and enhancement of fish and wildlife populations (Muchow and Mogel, 1996).[11]

Equal Consideration of Incommensurate Values?

While the 1986 ECPA significantly amended FERC's operating law in order to promote both environmental protection and comprehensive water planning, interpretation of its "equal consideration" mandate involves a number of ambiguities. Perhaps most noteworthy is the expectation or assertion that both material and nonmaterial entities are wholly commensurable and comparable along a single metric. [12] As such, attempts to quantify and assign dollar values to nonmaterial (e.g., aesthetic worth) or non-developmental (i.e., not directly related to hydropower) resources is inherently difficult since no conventional markets exists for such resources.

In response to this difficulty, FERC has identified three major problems with estimating and quantifying the value of these resources. First, the type of information needed to assess a dollar value on a unit of resource (such as dollars per recreation day or dollars per specific fish) may not exist. Second, unlike developmental values such as a unit of energy, the likelihood is small that people will agree on exactly what costs should be included in order to derive a value for a unit of a non-developmental resource. And third, when the information needed to assess a dollar value on a unit of a given resource does exist, it may be difficult to estimate how a proposed environmental measure (e.g., fish ladder) will increase the number of resource units (e.g., fish) (FERC, 1991; US FWS, 1998).

Economic Analysis and Project Relicensing

Despite such concerns, economic analysis remains an integral component of the FERC relicensing process. Fundamentally, this involves an assessment of the costs and benefits of project operations under a variety of proposed modes and conditions; where

proposals to relicense can range from continued dam operations under existing conditions, (e.g., the "no-action" alternative), to modified dam operations under alternative conditions, to outright dam removal (US FWS, 1998). The components used most commonly by FERC in estimating the net benefits for each of these licensing proposals include the benefits of power generation, costs of project operation, and costs of environmental measures. Thus, in determining which is most likely to provide the greatest public benefit, FERC is responsible for evaluating both developmental (e.g., power generation, water supply, irrigation) and non-developmental values (e.g., endangered species, recreational opportunities, aesthetics).

To accomplish this task, FERC has devised a methodology which focuses on six main categories of benefits and costs associated with power generation, project operations, and environmental measures. Three of these cost-benefit components are typically quantified and incorporated into FERC's net benefit estimates. These include annual gross power benefits, annual costs of operation and maintenance, and annual costs of environmental measures (US FWS, 1998). [13] The remaining three components are either assessed qualitatively because of difficulties in assigning dollar values to non-market amenities, or quantified but omitted from the calculation of net benefits. These include annual benefits of avoided pollution, annual benefits of project services (e.g., flood control), and annual benefits of environmental measures (US FWS, 1998). [14]

When considering a relicensing proposal, FERC will factor all six components of costs and benefits into its decision. However, in order to estimate annual net benefits, FERC rarely incorporates directly the qualitative benefits of avoided pollution, project services, and environmental measures (US FWS, 1998). As such, annual net benefits are

estimated by subtracting the costs of project operation and required environmental measures from the benefits of gross hydropower generation.

Nonetheless, FERC does have an official method to assess value to the factors not explicitly incorporated in the estimation of annual net benefits. Regarding the annual benefits of avoided pollution – which would come with relicensing a relatively 'clean' hydropower plant, FERC quantifies these by estimating the tons of several air pollutants (such as sulfur dioxide and nitrogen oxides) that would be emitted if a project's power were generated by an alternative source. In this manner, FERC equates the value of avoided air pollution with the cost of pollution control. (US FWS, 1998). In terms of the annual benefits of project services, FERC has not generally conducted formal assessments. In part, this is because the majority of proposed relicensing alternatives do not significantly change a project's services. However when dam removal is evaluated as a proposed action, assessment of a project's services would be warranted – at the minimum in a qualitative format (US FWS, 1998). For annual benefits of environmental measures, FERC generally considers the following from a qualitative perspective; geology and soils, water quality and quantity; fisheries resources, recreation; land use, and socioeconomic effects. And while FERC generally considers the biological and physical effects of various relicensing proposals, it rarely applies methods of economic valuation to translate those into terms that can be incorporated into the net benefit calculation (US FWS, 1998).

III. FERC Licensing in the Environmental Regulatory Arena

"The current public reassessment of dams can be seen as an extension of the 1972 Clean Water Act, which gave citizens the legal wherewithal to protect the health of their rivers" – Grossman 2002, 6.

Historically, the primary goal of FERC has been to promote and authorize the development of hydro-dams as a means to harness a river's power generation capabilities (HRC, 2001). Development of this renewable energy source oftentimes proceeded in unawareness or disregard of subsequent ecological impacts. In fact, a 1965 ruling from a US Court of Appeals found FERC to have been explicitly negligent in its consideration of environmental values in its licensing decisions.[15] During the ensuing years, the number of complaints against FERC's licensing process would grow; its procedures drew wide criticism from professional publications, congressional hearings, and interest groups. Various allegations included that the Commission's decisionmaking procedures made it difficult for environmental interests to participate effectively; ignored or altered the environmental recommendations of federal and state agencies; failed to conduct objective environmental analyses and enforce environmental conditions; and failed to establish and maintain constructive communication with the environmental community (Kerwin, 1990).

And while it is clear that hydropower dams have provided significant societal benefits for more than a century, it has come at a cost to river ecosystems, healthy fisheries, and recreation. Mounting recognition of these negative effects of hydropower development has focused attention on the operation of the thousands of dams subject to FERC regulation. And while the Commission has the exclusive right to license the construction, operation, and maintenance of nonfederal hydropower projects, other federal and state agencies have significant authorities to recommend or prescribe environmental conditions. In addition, FERC has become subject to an array of environmental policies that are not preempted by its organic legislation – the FPA.[16]

Rather, FERC's exclusive authority to license projects is subject to a system of checks and balances administered by other agencies and their statutory missions.

Federal regulatory and resource agencies that may be involved in a relicensing, depending on the nature and geographic location of the project and the resources affected, include the Environmental Protection Agency (EPA); US Fish & Wildlife Service (FWS); the National Marine Fisheries Service (NMFS); the US Geological Survey (USGS); the Forest Service (USFS); the Bureau of Land Management (BLM); the National Park Service (NPS); the Bureau of Indian Affairs (BIA); the Army Corps of Engineers (ACOE); and the Bureau of Reclamation (BOR).[17] FERC licensing procedures also involve state and local resource management agencies and the Commission must also work closely with the U.S. Coast Guard in reviewing the safety, security and environmental impacts of proposed Liquefied Natural Gas (LNG) terminals and associated shipping (HRC, 2005; NHA, 2006).

These agencies may exercise authority in the relicensing process through a variety of statutes, including the National Environmental Policy Act (NEPA); Clean Water Act (CWA); Fish and Wildlife Coordination Act (FWCA); various sections of the FPA; the Endangered Species Act (ESA); and the Magnuson-Stevens Fishery Conservation and Management Act (MSA).[18] By extension, a FERC applicant or licensee is required to consult with all involved federal resource agencies regarding environmental studies and the content of the draft and final license application. If the licensee chooses an alternative relicensing procedure, the federal agencies will likely be involved in designing the studies, reviewing study reports, assisting in the NEPA scoping process, and assisting in the development of the NEPA document.[19] Federal agencies may also participate in

settlement negotiations with the licensee and other stakeholders, if applicable (NHA, 2006). However, despite the increase in resources and activities that are now protected by these and other statutes and the fact that license applicants must consult with federal and state agencies, FERC has retained its final authority to decide what, if any, environmental conditions are imposed on its licensees (Kerwin, 1990).

The EPA and FERC

Since the FERC licensing and relicensing processes constitute federal actions, environmental review has been required since the passage of NEPA in 1969. To meet this mandate, FERC is obliged to conduct initial "scoping" processes to identify project issues and alternatives when a license or renewal is requested (NHA, 2006). Most often this is followed by an EA, which describes the existing environment and the applicant's proposal to operate a project while providing environmental enhancements. In the process, FERC is required to analyze the project's potential effects on environmental resources; after which it determines how the project should be operated to balance power and non-power values. When initial analysis in the EA indicates that licensing or relicensing would significantly affect the quality of the environment, or if the project's scope or impact indicates otherwise, FERC (usually through a contractor) is required to prepare an EIS – which requires greater public comment and evaluation of alternatives to the proposed agency action (NHA, 2006).

However, since FERC is the lead agency for hydropower licensing decisions, it ultimately controls the timing and content of environmental reviews under NEPA (HRC, 2001). Under current regulations, it is not required to provide a schedule or deadlines for completion of its draft or final NEPA documents. As a result, delays are common due to

FERC's failure to set a schedule, disputes among participating agencies, and/or complexities involved in drafting multiple project reviews (HRC, 2001).

The Federal Water Pollution Control Act Amendments of 1972 and 1977, which came to be known as the CWA, also mandate the Commission's involvement with EPA. Specifically, the CWA prohibits the discharge of pollutants or fill into most waterways of the US without a permit issued under EPA's National Pollutants Discharge Elimination System (NPDES) or the ACOE's Section 404 permit. As such, before FERC issues a license to construct or operate a hydroelectric dam, the owner must secure a water quality certificate – known as a "401 Certification" from the relevant state water quality agency (HRC, 2005). Furthermore, it is common for the state agency to require that the licensee perform specific studies to evaluate the hydro project's effects on water quality prior to such certification and FERC must incorporate the conditions for 401 Certification into its final license conditions (HRC, 2005).

An area of uncertainty regarding what specifically constitutes a hydroelectric plant's "discharge" has led to recent controversies when the FERC licensing process involves dams that operate in a so-called "instantaneous run-of-river mode" (HRC, 2006d). Hydro dams of this sort do not impound or store any surplus water in reservoirs. Rather, they generate electricity as water passes through their hydroelectric turbines with no net volume of water being released. At times, owners of a variety of such dams have argued that because the dams do not directly pollute the water as it passes through the dam, the release of water by the dam fails to constitute a discharge subject to federal regulation under Section 401 of the CWA.[20] In such cases, state agencies are able to

make recommendations for environmental controls to the federal manager (FERC), but not mandate actions to protect water quality standards within their borders.

Endangered Species

Because dams and hydroelectric facilities compromise the movement of fish and other aquatic species, their construction and operations have been subject to requirements of the ESA since its passage in 1972. Not only do hydropower dams block both the annual migration of diadromous fish (those whose lifecycle involves both fresh- and saltwater) and seasonal movement of potamodromous fish (e.g., freshwater-only fish), their power-generating turbines often serve to mortally slice virtually any species moving downstream. And while modern technology exists to promote the passage around or over dams and away from hydropower turbines, the decline of many species persists and scores of structures have yet to be retrofitted. Because of such conditions, the FERC relicensing process has become intricately linked to concerns over endangered species and the resource agencies which implement the ESA.

Specifically, the ESA requires that all federal agencies "insure that any action authorized, funded, or carried out by such an agency ... is not likely to jeopardize the continued existence of any endangered species or threatened species". To assist agencies like FERC in complying with this mandate, the ESA requires that it (e.g., FERC as the 'action' agency) formally consult with the FWS or NMFS whenever the action agency determines that its action "may affect" a federally-listed species (U.S.C. § 1536(a)(2)). In addition, various amendments to the FWCA between 1946 and 1965 require that license applicants consult with the appropriate federal and state agencies prior to submitting their applications to FERC.

FERC and the FWS

The US FWS is housed within the Department of Interior and is charged with the conservation, protection, and enhancement of fish, wildlife, and plant resources which do not use marine habitat (FWS, 2006). In terms of aquatic species, the Service primarily regulates the conservation of potamodromous fish populations (e.g., those which spend their entire lives in freshwater). In pursuit of its mission, the FWS may prescribe mandatory fish passageways to promote recovery of such riverine fish.[21] In addition, the Service may choose to adopt 'Reasonable and Prudent Alternatives or Measures' to advance recovery of non-marine species listed under the ESA and may recommend additional environmental conditions under the FPA and the FWCA (HRC, 2005).[22]

FERC and the NMFS

FERC licensing is also subject to regulations implemented by the US NMFS – an agency within the National Oceanic and Atmospheric Administration (NOAA) of the US Department of Commerce. The mission of the NMFS is to manage, conserve, and protect living marine resources that spend at least part of their life cycle within a marine area known as the "US Exclusive Economic Zone".[23] Similar to the FWS, NMFS may establish 'Reasonable and Prudent Alternatives or Measures' under the ESA to prevent a hydropower project's take of listed marine animals or diadromous fish. This latter category of fish include both catadromous (e.g., hatch in freshwater and migrate to sea to spawn – such as American eel) and anadromous (e.g., hatch in freshwater, migrate to the sea, and return to freshwater to spawn – such as salmon or steelhead trout).

Under the MSA of 1976, NMFS is empowered to consult with FERC on any licensing action that has the potential to adversely affect essential fish habitat for listed

diadromous fish.[24] In addition, both the FWCA and sections of the FPA permit the NMFS to recommend conditions for any license or relicense to protect, mitigate damages to, and enhance fish and wildlife; including related spawning grounds and habitat. An additional section of the FPA empowers the NMFS to recommend other conditions to ensure that a project is best adapted to comprehensive plans for developmental and non-developmental resources (HRC, 2006). [25]

Public Lands, Resources, and Recreation

Since FERC has primary jurisdiction over most non-federal hydropower dams located on federal public lands or federal reservations, its licensing authority and decisionmaking necessarily involve land and resource management agencies from the Departments of Interior and Agriculture. In the American West, this involvement is made particularly significant by the magnitude of federal land ownership.[26] In this dissertation, the in-depth case study chosen is located in the state of Montana, where the federal government owns nearly thirty-percent of all lands (Rosenbaum, 2005). This federal ownership is primarily under the USFS, NPS, BLM, and BIA. [27]

FERC and the Forest Service

As an agency within the US Department of Agriculture, the USFS chiefly administers the nation's National Forests and Grasslands. Under the FPA section 4(e), the USFS has authority to require that a license for a FERC-project which occupies lands or waters of a National Forest include the necessary conditions to assure the protection and use of the affected resources. Regarding the use of USFS resources, such conditions often mandate the high productivity of renewable resources as provided by federal

statute.[28] In addition, the Service may recommend environmental conditions for a hydro project that affects a National Forest without directly occupying it.[29]

FERC and National Parks

Within the US Department of Interior, the NPS is charged with the (unimpaired) preservation of the natural and cultural resources and values of lands within the National Park System and beyond. As such, the NPS is actively involved in hydropower regulation on both Park and non-Park lands. This latter type of involvement is actually more common, whereby the NPS participates in license proceedings where hydropower operations do not directly affect a National Park. In this context, the Park Service's primary function is to advise FERC under the FPA and represent public interests in recreational and river conservation opportunities (HRC, 2005).[30] For license proceedings where hydropower operations directly affect a National Park, the Service also provides advocacy for the protection and enhancement of park resources. Nonetheless, several FERC-licensed projects operate within National Parks – either because they predate the 1921 prohibition of such construction or are permitted through special legislation. In addition, many other hydropower dams are located upstream of National Parks and affect flows through park lands. A law codified in 1992 prohibits the issuance of licenses for new projects within the boundaries of a National Park System unit if the project would have a direct adverse effect on federal lands within the unit (New Mexico Center for Wildlife Law, 2006).

An additional component of NPS involvement in hydropower licensing relates to its mandate to implement technical assistance provisions in the Wild and Scenic Rivers Act of 1968 (WSRA) and the Outdoor Recreation Act of 1963. Regarding the former,

the NPS is responsible for maintaining a list of all designated rivers under the WSRA and those that are being studied for potential inclusion. Section 7(a) of the WSRA prohibits FERC from issuing a license for construction of any project "on or directly affecting" a wild and scenic river. This section also limits the power of any federal agency to assist in the construction of any "water resources project having a direct and diverse effect on the values for which the river was established." (NHA, 2006). In terms of the latter, the NPS provides technical assistance and promotes the coordination of activities generally relating to outdoor recreation resources including rivers and associated trails (HRC, 2005).

FERC and the Federal Dam Builders

Despite the fact that FERC's regulatory authority does not apply to dams and hydropower plants constructed and operated by either the ACOE or BOR, licensing procedures do involve both of these preeminent federal dam builders. Regarding the former, conditions of a FERC license may require that a project coordinate its operations with any Corps' dam located in the same watershed. Furthermore, the Corps may establish protocols for the flood control operations of any FERC-licensed project and may require any additional measures necessary for commercial navigation. Regarding the Bureau, its participation is mandated in licensing proceedings where a hydropower plant that a non-federal licensee proposes or owns is located at a federal dam, or if a licensed project may otherwise affect the operation of such a dam (HRC, 2005).

State Regulatory and Resource Agencies

While the focus of the next chapter is dam removal and river restoration in the state and sub-state administrative contexts, FERC licensing necessarily entails

involvement of relevant state-level agencies. Specifically, section 401(a) of the CWA requires that states issue a certification that a license will comply with all applicable water quality standards. Without such certification from the state level, FERC may not issue a license. In addition, public utilities commissions at the state level regulate the rates for any retail service of electricity generated by a hydro-project. State departments of fish and game, natural resources, and/or health may also invoke sections of the FPA and recommend environmental controls for the protection, mitigation, and enhancement of fish and wildlife resources and recreation.[31]

FERC and Dam Removal

By most accounts, FERC has traditionally been supportive of the needs and interests of the water and power industries while neglectful of environmental concerns about dammed and diverted rivers (Grimm, 1990; Kerwin, 1990; Blumm, 1991, McCully, 1996; HRC, 2001). Even after passage of the ECPA in 1986, FERC's traditional methods of operation did not immediately change; the Commission employed its discretion to offset many of the new legislative and judicial requirements (Pope, 1999; Lowry 2003). In fact, a review of relicensing decisions during the early 1990s revealed FERC's persistent willingness to grant preference to hydropower interests at the expense of fish and wildlife protection (Lowry, 2003). A more recent study reached a similar conclusion, suggesting that FERC continues to retain institutional mechanisms and biases toward dams and power generation that impede full consideration of dam removal and river restoration (HRC, 2001).

Thus, while the concept of dam removal as an effective river restoration tool has grown in acceptance during the previous decade – to the extent that it is currently

implemented across the nation, FERC's use of this emergent mainstream tool is unclear because of past controversy and lack of consistent policies or procedures (HRC, 2001). In addition, the policy option of dam removal to achieve environmental goals continues to be a political issue that often divides the Commission.[32] Oftentimes, this serves to make consideration of dam removal a political debate rather than a structured analysis and deliberation of costs and benefits (HRC, 2001). This often-divisive political nature adds complexity, which can cause delay in FERC licensing where dam removal represents a viable option. According to a recent study, questions about jurisdiction, financing, the legality of ordered removals, disposal of lands and waters, and associated regulatory requirements all represent areas of unfamiliar territory for FERC and often work to complicate and delay relicensing proceedings (HRC, 2001).

A Regulatory Program Transformed

Despite these patterns, there is evidence to the contrary, suggesting that environmental mandates from the 1986 ECPA and subsequent policies – along with court rulings and increased lobbying efforts – have sufficiently permeated FERC's decision-making processes as to influence behaviors and decisionmaking (e.g., Kerwin, 1990) and evoke dramatic policy changes (e.g., Grossman, 2002; Lowry, 2003; American Rivers, 2006; HRC, 2006a). In particular regards to the influencing of FERC behavior, Kerwin (1990) found that over a ten year period (1978-1988) FERC amended virtually all significant aspects of its hydropower licensing program in response to a host of pressures. These included external pressures (e.g., Congress, the President, courts, and interest groups) and internal pressures for change (e.g., conscious efforts by FERC to balance and service the contending interests the various external forces). By reviewing this host of

external pressures and how FERC responded internally, Kerwin (1990) maintains that the Commission's regulatory program was transformed; it began to sacrifice its own discretionary power in favor of productivity and responsiveness.

Kerwin (1990) traces the origin of this reform to the oil embargo of 1973. The subsequent energy crisis prompted Congress to undertake a series of actions; including passage of the Public Utilities Regulatory Policy Act (PURPA) in 1978 and a set of new tax provisions that created unprecedented incentives for development of small hydroelectric projects. As a result, FERC's workload increased dramatically (yet its budget did not), as it faced an onslaught of new applications from smaller-scale entrepreneurs with modest financing.

In this post-PURPA energy environment, FERC also confronted an onslaught of direct, external pressures from environmental interests (Kerwin, 1990). One form of pressure came from a host of federal court rulings; all of which clearly challenged FERC's position that it was the exclusive authority for hydropower licensing. Together, these rulings had the effects of reducing the number of projects likely to be developed and burdening the Commission with costly and time consuming lawsuits. Also with the host of new precedents that were set, the potential for future lawsuits became a persistent threat. During the same time, a second form of external pressure came with the dramatic increase in environmental recommendations imposed by government agencies for individual licenses. Both the number and extensiveness of the recommendations increased, which raised the projected costs to the licensee. The costs to FERC were also raised because of a requirement in the 1986 ECPA that FERC, not the licensee, negotiate

directly with the agency or agencies when it disagrees with the environmental conditions recommend.

According to Kerwin (1990), these two sources of external pressure caused FERC to change internally in two fundamental respects. First, the increased operational costs prompted FERC to incorporate into its licensing procedures a central role for negotiation and bargaining between government agencies and applicants. And since protracted conflict would likely threaten financing and delay the start of project operations and revenue flow, licensees were increasingly compelled to negotiate and accommodate the environmental conditions recommended by federal and state agencies. This required that FERC yield considerable discretion and control in its decisionmaking. However in doing so, Kerwin (1990) argues that FERC enhanced its productivity and responsiveness to environmental concerns. Second, in response to the rise in lawsuits and environmental conditions recommended by state and federal agencies, FERC began to issue specific rules and guidelines regarding the environmental dimensions of its hydropower licensing. By making formal policy statements on a host of environmental matters, FERC was sending a clear message to applicants that they take serious efforts to cooperate with government agencies during the development of environmental conditions. In doing so, Kerwin (1990) maintains that FERC transformed itself from a regulatory agency that

> "dealt [previously] with conflict over environmental policy by issuing licenses with requirements for future studies and the possibility of future restrictions ... into one that delayed action on individual licenses until the general policy issues were resolved" (97).

Hydropower Reform Continued

"As many as e hundred m licenses will come up for [FERC] *review by 2010. It cannot be assumed that all those licenses will be renewed"* – Grossman 2002, 5.

The use of policy mechanisms such negotiation and bargaining has continued to play an important role in FERC decisionmaking. During the past decade in fact, a host of collaborative working arrangements among diverse sets of private stakeholders, interest groups, and representatives from FERC and other government agencies have advanced policies to achieve river restoration through improved operations at hydropower dams, a more rigorous licensing process, and removal of selected dams (HRC, 2006a). At the national level, the most influential of these collaborative arrangements has been headed by the Hydropower Reform Coalition (HRC) since its founding in 1992.

As a consortium of over one-hundred-and-thirty national, state, and local organizations representing more than thirty states, the HRC works to reform national hydropower policies and achieve improvements to rivers altered by hydropower dams.[33] As of early 2006, the HRC had listed twenty-one completed settlements with diverse partners in order to improve river health and enhance recreational and cultural values (HRC, 2006a). Of these, seven agreements include dam removal as the primary method of river restoration and an additional (eighth) agreement involved FERC's rejection of an application to construct a large hydropower dam on Idaho's Snake River.[34]

In large part, this advancement of dam removal as a viable policy option stems from FERC's release of an official policy on dam decommissioning and removal. On December 14, 1994, the Commission issued its "Policy Statement on Project Decommissioning at Relicensing", which outlined its authority to order the decommissioning of a hydropower dam. Under the FPA, FERC is obligated to issue only licenses that are in the public interest, while giving equal consideration to the power and non-power values of a project. This prompted the Commission to accede that when it

could not develop license conditions to meet its public interest obligation, even with ample use of its conditioning authority, it had the authority to deny the relicense application and order a dam to be decommissioned and removed. Such a formal enunciation of a policy statement specific to the environmental dimensions of its licensing authority fits nicely with Kerwin's previous suggestions regarding internal pressures and changes to FERC's rulemaking.

Prior to the announcement, FERC had no policy specific to dam removal, as the FPA is silent on the issue – with the implicit assumption that continued operation of dams is in the public interest. And because regulatory prescriptions used in license proceedings for small, privately-owned dams typically emerge from state environmental agencies – a third of which have no statutes regarding dam removal, FERC's 1994 statement remains somewhat of an exception (Doyle et al., 2003).

IV. FERC as Precedent Setter

Less than a year after the 1994 policy statement, FERC set precedent during a relicense hearing with a landmark draft EIS-recommendation for removal of the Newport No. 11 Dam on Vermont's Clyde River (AFS, 2005). Spring flooding during 1994 had partially breached the dam and since its license had previously expired, its owners were seeking a relicense prior to rebuilding the hydropower facility. With a removal recommendation from the Vermont Department of Fish and Wildlife, FERC ruled against reconstruction and the dam was completely removed in 1996 in order to meet state objectives for restoring fish habitat. This represented the first time FERC recommended removal as a preferred alternative against the wishes of a dam owner (American Rivers et al., 1999).[35]

Edwards Dam

Nevertheless, nearly three additional years elapsed before FERC would implement its 1994 statement and order the removal of an existing and fully-functioning dam at the objection of its owners. Thus in November of 1997, FERC formally exercised its decommissioning authority when it denied the relicense application for the Edwards Dam on Maine's Kennebec River. Edwards thus became the first large dam with operational hydroelectric facilities to have its application for a new license refused by FERC on the grounds that the power it produced fell far short of justifying the ecological harm it caused.[36]

In its relicensing decision, FERC ordered that the dam owner submit a plan to the Commission for removal. This order included plans for financing the removal, which initially assessed full liability to the dam's owner.[37] Following a comprehensive settlement among all parties directly involved in the relicense proceeding, removal of Edwards dam occurred between July and October, 1999. Its removal opened seventeen miles of restored river habitat and historic spawning grounds for eleven species of anadromous fish; including the endangered Atlantic salmon and shortnosed sturgeon (American Rivers, 1999).

Clearly, these two precedent-setting FERC rulings increased the visibility and provided legitimacy for the policy option of dam removal as a means to promote river restoration. Subsequent FERC rulings have facilitated the removal of other dams across the Northeastern US.[38] And while particular states in this region continue to lead the nation in the number of dams removed (across all jurisdictions), the FERC relicensing process has in recent years produced removal orders for dams across the US.[39] In this

sense, dam removal – as a policy output of the FERC licensing process – has diffused across the nation.

V. 21st Century Dam Removal in the American West

Elwha River Dams

"This will be an enormously important precedent for dam removal. People will look to the Elwha as evidence of whether this kind of project can really work" – Grossman (2004).[40]

In the American West, FERC has chosen the policy option of removal for a host of hydro dams it regulates in Washington, Idaho, Oregon, Montana, and Arizona.[41] In Washington – a state without a specific dam removal statute, FERC's involvement in the politics of dam removal dates at least to 1973, when an operating license for a dam under its jurisdiction expired.[42] That year, the owner of the Glines Canyon Dam, constructed on Washington's Elwha River in 1927, filed an application for renewal to FERC. Cognizant that the 1921 FPA prohibited hydroelectric dams in national parks, a coalition of conservation groups formally intervened before FERC and argued that the expiration of the 50-year license of the dam (located inside the boundaries of Olympic National Park, which was created in 1938) be treated as a new license application. In addition, the groups argued that a second dam (Elwha Dam built in 1913) lower on the river outside the modern-day national park should not be licensed at all (American Rivers, 2006a).

Since then, concerns mounted with the dams' owner(s) (currently the Fort James Corporation) that a court's order would someday force it to remove the dams and assume financial liability for river restoration. Viewed as a potential liability, the various owners of the dams have long since sought ways to transfer them to the federal government (American Rivers, 2006a). Major progress toward removal did not transpire until the

early-1990s, when the Park Service declared its support for restoring the Elwha by removing the dams and FERC released its draft EIS, declaring that only removal of the two dams would ensure full restoration of the river and its anadromous fish (Grossman, 2002). In 1992, Congress passed the Elwha River Ecosystem and Fisheries Restoration Act, which mandated the river's restoration and prohibited any additional licensing proceedings on either of the two dams. The Act also directed the Secretary of the Interior to study ways to ensure complete restoration, including purchase and removal of the dams and in 1996, the federal government declared it would do both. By early 2000 and after more than twenty years of legal maneuvering around the FERC-licensing process, the two dams were purchased by the government for $29.5 million and were placed under the operation of the Bureau of Reclamation, with National Park Service oversight. Decommissioning and removal activities are scheduled to begin in 2008.[43]

The Elwha restoration effort will entail the intentional removal of the two largest dams in history, with Glines Canyon Dam standing at 210-feet and the Elwha Dam 108-feet-tall. The unprecedented scale and complexity of this undertaking is scheduled to transpire over a two-and-a-half year period and will provide the unique opportunity for scientists from a host of disciplines to study the myriad effects involved with such a dynamic undertaking of engineering and ecological restoration.[44] The entire Elwha restoration project will cost an estimated $182 million (Downing, 2004).

Cushman Hydroelectric Project

The issue of dam removal in the FERC-licensing context emerged on another of Washington's coastal rivers in 1998. In its order on relicensing for the Cushman Hydroelectric Project on the North Fork of the Skokomish River near Tacoma, WA,

FERC mandated a set of environmental conditions which the project's owner claimed would render the two-dam project uneconomic. Specifically, FERC mandated that the project's operators substantially reduce the amount of water diverted from the watershed in order to maintain minimum in-stream flows necessary for anadromous fish recovery. Prior to the order, operation of the two dams effectively diverted ninety-three percent of the river's flow at the lowermost dam and had deleteriously affected the river's ecosystem and estuary since 1930 (American Rivers, 2006c). The project's owners appealed the conditions placed on the new license and temporarily succeeded in forcing FERC to reduce the volume in-stream flows by a factor of four. However, the minimum flows stated in the original relicense were reinstated by FERC in June of 2004 and currently; the license is again under appeal for allegedly rendering the project uneconomic by mandating year-round minimum flow levels to allow viable fish migration.

This appeal to the US Court of Appeals (DC Circuit) by the City of Tacoma, WA and other industry intervenors is significant on a number of grounds. Of particular relevance is the claim that a new license with conditions that render a project uneconomic constitutes a de facto decommissioning, and that FERC has no authority to order decommissioning of a project; either indirectly or directly. It would appear that FERC's 1994 policy statement provides clear authority to deny a relicense application and order removal of the dam. In addition, FERC's statutory authority under the FPA grants the Commission with broad powers to implement the Act's goals in order to protect the public interest. As such, the authority to order decommissioning of a dam would appear

to fit squarely within these powers. FERC also has authority to order a dam to be removed if it poses a safety threat through FERC's dam safety regulations.

Negotiated Settlements and Dam Removal

FERC-licensing necessarily involves a long and complex process, where costly litigation, protracted conflict, and delayed implementation of environmental controls and/or project upgrades are common. Therefore, virtually all parties involved in a relicense proceeding, including FERC, naturally favor a negotiated settlement whereby the outcome is satisfactory for the majority of interests (Kerwin, 1990; HRC, 2001). And for hydropower dams where safety, environmental, and/or economic concerns are rather unambiguous, dam removal oftentimes represents the most scientifically rational and cost effective policy option. This is particularly the case for dams constructed early in the twentieth century and where reservoirs are overly laden with silt and/or original dam purposes are no longer achievable. In fact, the magnitude of the aging of America's dams is reflected by the estimate that eighty-five percent will be near the end of their operational lives by the year 2020 (FEMA, 1999). For many of these older dams and hydropower plants where such conditions are real or imminent, the owners may decide to either voluntarily surrender an existing license prior to its expiration or forego a new license after its current one expires.

Pacific Northwest

In the Pacific Northwest, where hydroelectric power accounts for approximately seventy-percent of the total electricity used, such negotiated settlements have emerged in Washington and Oregon (AFS, 2005).[45] Regarding the former, an agreement to remove the one-hundred-and-twenty-five-foot-tall Condit Dam on the White Salmon River was

reached in September of 1999. Since the dam was constructed prior to the FPA, it did not receive an operating license until 1968. As this thirty-year license neared expiration, FERC issued a final EIS in 1996.

The document outlined the environmental mitigation and enhancement measures necessary to ensure adequate resource protection. These conditions primarily consisted of construction of fish ladders and screens; which totaled $30 million (Grimaldi, 2003). The dam's owner (PacifiCorp) determined that compliance with the new requirements would make the project uneconomic to operate over the life of a new thirty-year license and thus petitioned FERC to halt the licensing proceedings. PacifiCorp also initiated settlement discussions with a host of formal intervenors. The resulting agreement permitted PacifiCorp to continue power generation for seven years, without installing the FERC-mandated requirements. During this time, funds generated by the operations were directed to a fund for financing the $17 million dam removal and associated mitigation measures. When its removal is completed, forty-three miles of the officially-designated Wild and Scenic White Salmon River will be open to migrating species of anadromous fish for the first time since 1913.

In a 1999 Oregon relicensing case, the policy option of dam removal emerged early in the FERC process when a project's owner, Portland General Electric Company (PGE), announced that it would not seek a new license for its Bull Run Hydroelectric Project on the Little Sandy River – approximately thirty miles east of Portland. And while the original license was set to expire in November of 2004, PGE took the proactive (and largely unprecedented) step in 1999 of applying to FERC for permission to surrender the project's operating license.[46] According to PGE, the likely cost of

providing the necessary level of protection, mitigation, and enhancement for the resources affected by the project would outweigh the economic benefit of hydropower generation over the life of a new thirty-year license (PGE, 2002). PGE then convened a "Decommissioning Working Group" composed of all governmental and nongovernmental stakeholders in order to develop a "Decommissioning Plan", intended to maximize benefits to the resources affected by the project.

These efforts were successful and by 2002, an official negotiated settlement had been signed by the twenty-three main parties (PGE, 2002). The agreement described the legal context and regulatory authorities and related obligations of each of the parties. In order to allow sufficient time for the necessary pre-removal studies and permitting, PGE successfully applied to FERC to have its existing license's term extended to 2007, during which time PGE is required to implement interim protective measures for threatened and endangered species – including Chinook salmon on their Fall migration. Presumably, this request was also made to extend the project's operating time in order for PGE to further capitalize on the sale of its hydropower so it can ultimately pay the estimated $17 million cost for which it is entirely responsible. In addition, the agreement requires that PGE donate the project's water rights to the public and contribute 1,500 acres to a planned conservation area at the dams' current locations. Regarding the actual dam removals, the forty-seven-foot-tall Marmot Dam is slated for 2007-2009 and the sixteen-foot Little Sandy Dam is slated for 2008-2009.

The same years as the Bull Run dam removal decision, a similar settlement was reached to remove another of Oregon's FERC licensed dams. Based on a settlement reached in 2003, the six-megawatt Powerdale Dam on the Hood River will receive an

operating extension in order to allow for additional revenues to be used for removal and completion of studies at an onsite fishery facility. The primary parties involved were the dam's owner PacifiCorp, FERC, state and federal agencies, the Confederated Tribes of the Warm Springs Reservation, local river users, and environmentalists (BPA, 2003). FERC officially accepted the license surrender and decommissioning plan for the hydropower dam in November 2005 and removal of the ten-foot-high and two-hundred-and-six foot-wide diversion dam and associated structures is set to begin in April 2010. It was constructed in 1923 and since then had blocked passage for threatened Chinook salmon as well as steelhead and bull trout (BPA, 2003).

American Southwest

In the arid southwestern US, the policy option of dam removal has also emerged from negotiated settlements during the FERC licensing process. For example, on central Arizona's Fossil Creek, hydro dam operator Arizona Public Service (APS) announced in 1999 that it had decided to decommission its Childs and Irving Power Plants and restore the creek's full flow. APS had initially applied for a license renewal in 2000, as its original 1951 license would soon expire. However, the public utility soon realized that despite the costs of decommissioning and lost revenue from operations at the state's oldest commercial plant, removing the structure and restoring natural flows outweighed the business benefits provided by the aging facility.

The decision of APS to surrender its operating license emerged after four years from a diverse cooperative effort among state and federal agencies, Native American tribes, conservation groups, and universities.[47] In the end, APS received a "Surrender Approval Order" from FERC in October 2004, which formally authorized the

decommissioning and removal of the Childs and Irving Hydroelectric Power Plants. Actual removal of the twenty-five-foot-high main dam and subsequent river restoration are scheduled for completion by 2009 and the site should be returned to the USFS by that year's end.[48]

The removal of this FERC-regulated dam and restoration of one of the few perennial creeks in the state of Arizona involve an additional dimension. On June 18, 2005 (the same day APS formally decommissioned the dam) Arizona Senator John McCain (R) committed himself to introduction of a bill to protect Fossil Creek in the National Wild & Scenic Rivers System. This designation would provide the USFS additional authority and resources to protect the creek's unique features; including unusually high mineral levels which create unique formations in this spring-fed stream and provide critical habitat for several species of threatened and endangered desert fish.[49]

VI. FERC Relicensing and Recent Reforms

Within the first decade of the twenty-first century, an estimated 700 hydropower projects and dams will be subject to FERC relicensing (Grossman, 2002). And while the environmental component of this process has been greatly strengthened and elevated in public and political exposure, current concerns over energy production and related impulses to expand clean forms of domestic production have resulted in a number of reform proposals to streamline the relicensing process and deregulate aspects of FERC regulation.[50]

Regarding FERC's Traditional Licensing Process (TLP), the Commission issued a Final Rule to revise its regulations under the FPA on July 23, 2003. In effect, these revisions created a new licensing process, termed the Integrated Licensing Process (ILP),

in which the pre-filing consultation of a potential license applicant and FERC's scoping processes pursuant to NEPA are conducted concurrently, as opposed to sequentially (FERC, 2003). After a mandated two-year transition period, the ILP became the default process and a licensee must now request authorization to use either the TLP or the Alternative Licensing Process (ALP). Rationales and intended improvements that have been given for FERC's creation of the ILP include greater coordination among the Commission and federal and state agencies with conditioning authority; the combining of redundant processes; the reduction in times and costs related to relicensing; the establishment of process plans, schedules, and deadlines for all participants in a relicensing, including FERC staff; increased public participation in the pre-filing consultation process; and the identification of issues early in the environmental scoping process (FERC, 2003; HRC, 2005c).

In regards to the current national priority to expand domestic development of clean energy sources, a significant set of reforms emerged with the passage of the 2005 Energy Policy Act (Act). In response to the Act's passage, FERC Chairman Kelliher stated the following.

"This energy bill gives the Commission significant new responsibilities to oversee and enforce mandatory power grid reliability rules, to protect against market manipulation and the exercise of market power, to reform the hydropower licensing process and to strengthen our nation's energy infrastructure – particularly the interstate transmission grid and liquefied natural gas import facilities." [51]

Singed into law on August 8th, 2005, the Act required that the Departments of Agriculture, Commerce, and the Interior develop new rules for the hydropower licensing process. And while each agency published its own set of rules, the three sets were functionally identical and thus published as a set of "interim final" rules in the Federal

Register on November 17th, 2005 (HRC, 2006b). In general, these rules provide a series of new administrative procedures whereby any party to a FERC licensing is allowed to challenge the underlying scientific data behind the conditions that for decades have been placed on hydro dams to mitigate environmental damages.[52] For the operators of hydroelectric dams, this provides a new source of leverage to challenge existing conditions which may require them to provide adequate means of fish passage; protect lands on and around rivers; or help keep water clean and at natural flow levels (HRC, 2005a). The new rules also provide producers of hydroelectricity with the ability to propose alternative operational conditions that either cost less or allow for augmented power generation. Critics have argued these changes provide hydropower companies with more rights than states, Native American tribes, and state and federal resource agencies with a stake in dam relicensing (Trout Unlimited, 2005; HRC, 2006b).

In addition, many of the nation's leading conservation organizations claim that these new procedures for FERC licensing collectively favor the hydropower industry at the expense of other social and ecological concerns (e.g., Trout Unlimited, 2005; American Rivers, 2006; HRC, 2006b). Specifically, these organizations maintain that the 2005 rules create a new set of standards and criteria that are slanted towards increasing energy generation and decreasing dam owners' costs; feature a very fast timetable and technical burden that are difficult to meet without significant resources; and provide energy companies with a "do-over" by allowing them to reopen decisions that were previously finalized (HRC, 2006b). This last procedure, which permits the retroactive use of the new rules at hydro projects that have already passed the stage for final

environmental conditions, has been initiated by no less than nineteen license holders in the seven months since the Act's 2005 passage (HRC, 2006b).

An additional source of controversy stems from the new rules having been formally published as "interim final". This has prompted a coalition of conservation groups to file a compliant in the US District Court (Western Washington District) over the publication of the regulations as final; in lieu of a draft for public comment and for leaving incomplete significant administrative procedures. This compliant also challenges the retroactive effect given to the rules, which provides utilities the opportunity to weaken environmental protections that were likely finalized years earlier in the FERC-licensing process.[53] The first real test of the new rules will come on February 21, 2006 when the US Supreme Court is set to begin review of a case where a hydro dam operator chose not to implement a thirty-five-year-old provision in the CWA that gives states the right to protect their rivers from water quality problems caused by hydropower dams.[54] According the HRC's main website, the case has the potential to affect more than one-thousand federally-regulated hydropower projects on more than five-hundred rivers in forty-five states.

From an alternative perspective, the new procedures related to hydropower licensing that emerged from the 2005 Act were a welcomed and long overdue policy change. The National Hydropower Association (NHA) had lobbied Congress for decades for similar types of rule changes to reform and deregulate FERC licensing of hydro dams. In lobbying for passage of the 2005 Act, representatives from the NHA were quick to inform Congress that licensing reform is among the most pressing issues facing the industry, as over half of the nation's hydropower capacity – two-hundred-and-ninety-six

projects in forty-four states with a total energy capacity of over 30,000 MW – must receive a new operating license by 2018. Just months prior to the Act's passage, NHA's legislative affairs committee chairman told Congress the following.

"Time is running out for these projects to benefit from meaningful reforms. Congress must act this session" (NHA, 2005).

The NHA is the nation's leading non-profit association dedicated exclusively to advancing the interests of the U.S. hydropower industry. It was founded in 1983 and currently represents sixty-one percent of the domestic, non-federal hydroelectric capacity and nearly 80,000 megawatts overall in North America. Its membership consists of more than one-hundred-and-forty organizations including; public and private utilities, independent power producers, equipment manufacturers, environmental and engineering consultants and attorneys (NHA, 2006a). In a press release immediately following the Act's passage, NHA's executive director commented the following.

"The Energy Policy Act of 2005 ensures that the nation's existing hydropower infrastructure will continue to provide affordable, pollution-free, renewable, reliable and domestic energy for years and years to come. What's more, the bill virtually guarantees substantial hydropower growth for the first time in almost two decades. This energy bill is the most important piece of legislation for the hydropower resource in a very long time" (NHA, 2005).

While not directly or primarily focused on hydropower licensing, there have been a number of recent policies passed that have the potential to significantly impact FERC decisionmaking; from both procedural and resource-based perspectives. Perhaps most critically, in August 2005 NOAA Fisheries (otherwise known as the NMFS) issued its revised critical habitat designations for twenty species of endangered salmon and steelhead along the West coast. The decision prompted a nearly four-fifth's reduction in the previously designated areas, thus easing the way for potential development along

134,200 miles of previously off-limits rivers and streams (Brown, 2005). In all cases, NOAA declined to designate habitat where the species were historically found yet not at the present time, and all habitats above currently impassable dams. In effect, this has put the agency in a position where it continues to prescribe fish passage at hydropower dams and require fish to re-enter blocked habitat, while simultaneously claiming that the same habitat is not essential to the conservation of the species (HRC, 2006c).

In a similar context, NOAA Fisheries issued revisions to its hatchery policy in June 2005 that require salmon and steelhead born and reared in hatcheries and then released to be considered alongside wild fish born and reared in rivers when weighing the need for ESA protection. The populations of hatchery and wild species are then considered as one (e.g., an "endangered species unit" or ESU) and this unit becomes integral in assessing the overall health of a given stock, ESA listing decisions, and strategies for recovering imperiled stocks. The policy announcement also stated that sixteen stocks of Pacific salmon previously listed under the ESA would remain protected and included an extension on listing determinations for the Oregon coastal Coho salmon and ten populations of West Coast steelhead trout (HRC, 2006a).

The announcement to consider wild populations with those genetically modified and hatchery raised contradicts several groups of fisheries scientists that have published findings supporting the conclusion that hatchery fish should be excluded from ESA listings (e.g., NWFCS, 2004). Soon after the announcement, Dr. Jack Williams, senior scientist for Trout Unlimited commented the following.

"The conclusion of the vast majority of fisheries science's finest minds who've studied this problem is that hatchery fish and wild fish are different animals and must be managed accordingly, especially under the auspices of the Endangered Species Act. It's

puzzling that NOAA Fisheries would issue a policy that contradicts the advice of its own scientists" (HRC, 2006a).

FERC's hydropower regulatory program has produced and been subjected to a collection of dramatic changes in the past decade. In one respect, the Commission has responded to environmental concerns with a host of precedent-setting rulings against relicensing; these have prompted an increasing number of dam removals. Alternatively, the Commission has been subjected to the nation's growing demand for increased production of domestic energy; pressure to streamline its regulatory activities has led to reforms that will significantly impact its decisionmaking, from both procedural and resource-based perspectives. Taken together, these exert conflicting forces on FERC and suggest an uncertain future. Thus, it remains to be seen whether the policy changes to FERC's operating law will continue to facilitate removal of some hydropower dams or whether pressures to streamline its regulatory activities will inhibit future removals and river restoration efforts.

VII. Milltown Dam in the FERC Context

"The Clark Fork's bed is lined with proof of human greed, of years of laziness and neglect, our tendency toward excess, our lack of foresight. Indeed, for the hundred years from the 1880s to the 1980s, the Clark Fork River was, literally, a dump – a receptacle for mine waste, lumber mill byproducts, town garbage, litter, airborne pollution, car bodies, and packing waste" (Stone-Manning and Miller 2002, 1).

The Milltown Reservoir was created in 1907 with construction of the Milltown Dam at the confluence of the Clark Fork and the Blackfoot Rivers in western Montana. The site is approximately eight miles east of Missoula. The dam was built of wood, rock and concrete by mining magnate William Clark for the purpose of generating power for his two sawmills adjacent to the dam that produced timbers for nearby mine tunnels. Clark's Montana Power Company (MPC) was thereby created as a subsidiary of his

burgeoning activities upstream in the historic mining communities of Butte and Anaconda, MT. MPC was also the original player in the Milltown Dam saga and would come to represent "an institution" in Montana life and politics (Nielsen, 2005).

During their heyday (1880s – 1940s) Butte-area mines were among the largest in the world and produced an estimated twenty billion pounds of copper; five billion pounds of zinc; and 704 million ounces of silver. Periodically these would seep into the river and cause it to run brick-red for days at a time from Butte to Milltown (Stone-Manning and Miller, 2002). As a result, fish and other aquatic resources were killed and according to one account, there existed periods in the 1950s-60s when, in certain, highly-polluted stretches of the river, scientists could find no fish for years at a time. Furthermore, it wasn't until the 1950s, some eighty years after mining had begun in earnest on and around the Clark Fork, that the mining companies even began monitoring the pollutants they discharged. By then much of the most serious damage had already been done and throughout the 1970s-80s, rain periodically flushed metals from exposed mine tailings scattered along the river's banks. Such events further contaminated the water and massive fish kills have been recorded at least ten times during the past fifty-odd years (Stone- Manning and Miller, 2002).

A "Super" Site

"Nearly a hundred years old, cracked, and losing money, the [Milltown] *dam plugs the river just eight miles upstream of Missoula,* [MT] *...the 180-acre reservoir behind Milltown Dam is brimming with a potent store of sediments – 6.6 million cubic yards of them, laden with toxic metals that washed down from Butte's* [MT] *copper mines ... many have called it a toxic time-bomb"* – CFC, 2004.

The State of Montana filed a lawsuit against the Atlantic Richfield Company (ARCO) in 1983 to restore the natural resources of the upper Clark Fork basin to pre-

mining conditions. The suit was filed under the authority of the federal Superfund law, as provided by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This allows states, federal agencies, and Native American tribes to seek restoration costs for resources damaged by pollution from previous industrial and/or commercial activities. In the Milltown case, pollution in the form of contaminated sediments – including arsenic, copper, lead, zinc, cadmium, and other heavy metals – from upstream mining activities and smelters has accumulated in the reservoir behind the Milltown Dam since a dramatic 1908 flood. Since then, the sediments have poisoned local wells and surface waters with arsenic; some tests have confirmed levels in excess of ten times the federal drinking water standard (Nielsen, 2005). Copper contamination continues to adversely affect fish, including the federally-listed Bull trout, and other aquatic species during high seasonal flows and ice jams when sediments are scoured from the reservoir's bottom. The dam and surrounding area were proposed as one of the nation's first Superfund sites in 1982 and were formally listed in September 1983. Soon thereafter, the site was placed on the Environmental Protection Agency's (EPA) National Priority List.[55] The 120-mile stretch of river remains the nation's largest Superfund site, with Milltown Dam representing the terminus.

CERCLA and the Superfund require that the owner(s) of the facility from which contaminants were originally released be held responsible for cleanup at a listed site. At Milltown, that liability belongs to ARCO – now part of British Petroleum (BP), which bought the Butte-area mines and smelter from the Anaconda Company in 1979. And ever since realizing the purchase was a blunder, ARCO-BP has been debating their responsibility while attempting to downplay the risks associated with arsenic.[56] In

addition, ARCO has been compelled to work with EPA in studying possible cleanup options since the 1983 listing.

The hydroelectric facility at Milltown Dam received its first operating license from FERC in 1968. The twenty-five-year licensed expired in 1993 and the dam's continued operation was extended four times, in part to allow EPA time to select a final Superfund remedy. In 1999, EPA expressed opposition to the third of these extension requests and instead asked for FERC's cooperation in selecting a remedy for the site.

Milltown's last operating extension expired in 2004. Prior to this, EPA had repeatedly sought to determine whether the dam's then-owner (MPC) had intentions to relicense; modification or removal of the dam would normally be subject to FERC jurisdiction. For its part, FERC made clear that it expected EPA to finalize a remedy before it would weigh-in on the relicensing process (FERC, 2002). Yet all the while, the dam continued to produce a relatively minor 1.4 megawatts of electricity at a cost of $90 per megawatt. Megawatts were then sold for $22 each through the Western Energy company (MRA, 2004).[57] Regarding auxiliary purposes, the dam has never been used to store irrigation water or provide flood protection.

Structural Modification versus Dam Removal

Before the policy change proposal to remove the dam and dredge the most contaminated sediments from its reservoir became a viable option and genuine agenda item, focus was on a less- dramatic proposed remedy. Specifically, this initial plan entailed construction of two new fish ladders (one on the Clark Fork and the other on the Blackfoot) to promote recovery of the federally-listed Bull trout. It also called for additional construction to raise the height of the existing dam, in hopes of reducing the

amount of sediment that was routinely released by floods and ice floes. Early proponents of this latter, less-dramatic policy change were numerous and proved successful in delaying any significant changes from happening for roughly two decades.

Montana Power Company and NorthWestern Energy (NWE)

The primary support base for retaining the dam has come from the series of Milltown's owners. This began with its original owner, MPC. However, this longtime Montana institution experienced financial problems following deregulation of the nation's energy sector and eventually declared bankruptcy in 2003.[58] In the process, Pacific Power and Light Global, Inc. (PP&L) agreed to purchase all of MPC's coal-fired power plants and hydroelectric dams in 1998; except for Milltown, due to its potential liability and unresolved Superfund cleanup. In this sense, PP&L was not so much an opponent to dam removal, but rather sought to avoid controversy of the issue altogether (Nielsen, 2005).

MPC managed to find a buyer for its Milltown Dam and Reservoir in 2002. The South Dakota-based NorthWestern (NWE) would also go on to declare bankruptcy and its decision to purchase a dam at the terminus of the nation's largest Superfund site drew immediate attention. Initial scrutiny came from Missoula County Commissions when they discovered NWE had transferred all its assets – except Milltown Dam and Reservoir – to parent Company NorthWestern Corp (NWC). Evidence that MPC had been informed of this semi-secret deal prompted Montana's Attorney General to intervene in the 2002 transaction. The State was concerned that the agreement would stick taxpayers with a sizeable portion of the cleanup costs; NWE had recently placed the dam in a limited liability corporation as the primary asset (Devlin, 2003). This meant that liability

for the contaminated dam and reservoir would be limited to its partners' investment and thus, shareholders could not lose more money than the value of their shares, if the corporation ran into debt. By extension, shareholders would not have been personally responsible for the corporation's Superfund obligations.

FERC

The MPC – NWE was not the first instance when controversy over Milltown's ownership and secrecy about its safety had been an issue. In fact state officials discovered in 2001 that MPC had concealed critical safety information related to cracks in the dam (SEJ, 2003). In addition, information that had been obtained previously from FERC's website by an environmental health specialist with the Missoula City – County Health Department (MCHD) regarding foot-wide gaps near the foundation of the aging Milltown Dam had "disappeared" from the site by late-2002 (Nielsen, 2005; SEJ, 2003). The resulting controversy was indeed a test of FERC's new policy of restricting press and public access to "Critical Infrastructure Information", for fear it might be exploited by terrorists in the post-9/11 political landscape (SEJ, 2003). This prompted an official apology in early-2003 to the Missoula County Commissioners from whom FERC had withheld information about the dam's worsening structural flaws; these included countless voids between twelve and eighteen inches in the fill material between the dam's crest. Ironically, the information in question and FERC's apology remain listed as "non-public" – meaning that a formal request is required for public review under the Freedom of Information Act.

Based on these events, it appears likely that FERC, together with MPC and later ARCO, actively suppressed information regarding the dam's safety and structural

integrity and for a time, kept information away from the MCHD. Additional follow-up studies by the Department would prove instrumental in contradicting and exposing earlier FERC safety studies and arsenic data misrepresented by MPC and ARCO.

Bonner Development Group (and ARCO)

Initially in 1996, the Bonner Development Forum was created – named for the unincorporated community of Bonner, MT – to provide local communities near the Superfund site with clear information on the issues associated with arsenic contamination and site restoration (Matson, 2005). In 2001, hostilities and disparity among core values within the Forum prompted its split; a second group (e.g., Friends of Two Rivers) was organized to present an alternative to keeping the dam and develop a plan for an "in-place cleanup", where the contaminated sediments would be removed. In response, the remaining Forum members Forum proceeded to create the Bonner Development Group (BDG), as the local group most active in promoting dam retention.

Since the split, BDG was and continues to be funded by ARCO as the local forum that has most vigorously lobbied to keep Milltown Dam in place.[59] BDG's platform centered on the argument that the dam and reservoir were core community assets and therefore should be maintained and ultimately developed. An additional concern BDG promoted suggested that removal of the dam would result in a drastic reduction in property taxes that had long-since been paid to the local communities and the Bonner School District by the dam's various owners. In attempts to influence local residents and cultivate this concern, BDG routinely circulated "suspect" figures to dramatize the potential reductions in revenue sources and the tax base upon which Bonner School depends (Matson, 2005).

Focusing Events

Birkland (1997) suggests that focusing events (e.g., sudden and unpredictable events that garner widespread attention from the media, general public, and political decisionmakers) are critically important to agenda setting and oftentimes policy change. Further, he makes a distinction between such events and subsequent impacts to policy with reference to their degree of focalization. Thus events that are considered highly focal are extremely dramatic and virtually impossible to ignore by the public and political actors alike. By extension, these events are perhaps destined to elicit profound policy change. In the Milltown case, two such highly focal events transpired between 1990 and 1997; together these resulted in an avalanche of public and political interest in the dam's safety. Ultimately, the ensuring exposure and resultant 'socialization' or expansion of conflict across levels of government and administrative jurisdictions prompted fundamental policy change to transpire (Schattschneider, 1960; Baumgartner and Jones, 1993).

The first event occurred in 1991, when a high concentration of arsenic was discovered by the MCHD in the tap water of Milltown, MT. A second, larger sampling was performed and arsenic levels were even higher.[60] This prompted MCHD to require thirty-five families to abstain from using their wells for drinking water. The contaminated sediments in the Milltown reservoir (and groundwater) were eventually tracked to the now-defunct Anaconda Copper mine near Butte and the smelters near the headwaters of the Clark Fork River.

In the second event, the dam itself became part of the debate in February 1996; an unprecedented ice floe damaged the structure and released toxic sediments from the

reservoir bottom. At the time, EPA was set to release a cleanup plan that left the dam and sediments in place, permanently entombed and offered backup protection by an inflatable dam, when the ice floe occurred. A dramatic fish-kill downstream of Milltown occurred shortly thereafter and the spectacle of severely discolored water caught the attention of various special interests (environmentalists, fishermen, boaters, and economic development committees) and the general public. Soon thereafter billboards appeared, likening the dam to a time-bomb. Also that summer, no fish were found in the river immediately downstream from the dam.

The 1996 ice floe set the record for public comments on a Superfund site; over 13,000 of the county's 90,000 residents submitted their concerns to EPA during a thirty-day comment period (Nielsen, 2005). The event also had an impact on FERC, prompting the agency to reclassify Milltown as a "high hazard" dam. The US FWS reacted to the dramatic event in 1996, by targeting the dam as *the* impediment to the recovery of the federally-protected Bull trout.

The Clark Fork Coalition (CFC)

The CFC was created in 1983 as a local group dedicated to protecting and restoring water quality throughout the Clark Fork watershed. In specific regards to the Milltown case, the CFC has been extremely active in promoting full removal of the dam and the reservoir's contaminated sediments. Beginning in 1985, it was largely responsible for convincing the EPA to list the upper Clark Fork River as a Superfund site; during the ensuring years, the CFC was instrumental in persuading the EPA to adopt many of their suggestions in the government's cleanup plans for Superfund sites throughout the basin. At the Milltown site, the CFC was largely responsible for

convincing a majority of the public, key decisionmakers, and the EPA that the toxic sediments should be removed and that the dam should come down (CFC, 2004a). In fact, it was the CFC that launched the original campaign in 2000 to remove Milltown Dam and its toxic sediments.

Friends of Two Rivers (FOTR)

FOTR was organized in November 2001 as a result of the aforementioned split in the Bonner Development Forum and has ever since been very active in lobbying for the dam's removal. [61] It began as a small group of diverse neighbors in the local communities of Milltown and Bonner, MT. The members' unity of purpose stems from the common feeling that the best scenario for restoration at the Milltown site involved fundamental or "on-site" cleanup, whereby the entire dam and most of the contaminated sediments would be removed (FOTR, 2005). Matson (2005) described the group as the following.

"We [FOTR members] agreed we wanted to see restoration of the river bottom into an area that would be functional from a hydrological standpoint as well as a real asset to our community".

Similarly, Stone-Manning (2005) described FOTR as a group of concerned area citizens, "who were sick of the Bonner Development Group speaking for them." The group went on to sponsor public meetings on arsenic contamination, the effects of sediment and dam removal on groundwater in the Milltown area, and the structural condition of the Milltown Dam. FOTR published six newsletters reporting on these topics, plus the EPA's proposed remediation plan and the State's proposed restoration plan.

Montana's Civil Servants and Elected Leaders

At the local level, there were a number of individuals from Missoula City and County offices who were instrumental in the decades-long process to remove Milltown Dam and the contaminated sediments beneath its reservoir. And it was the CFC's relentless campaign to remove the dam and sediments which ultimately garnered unanimous support from Missoula's City Council and its County Commission in 2001.

Initial support for Superfund listing due to health concerns came from the MCHD and the agency continued to produce findings in support of dam removal full site cleanup. A few specific individuals were of importance at various times; they included environmental health specialist Peter Nielsen, the MCHD employee who "found" the controversial materials which FERC later suppressed; Jim Carlson, the environmental health director at the MCHD; County Commissioners Michael Kennedy and Barb Evans (a conservative); it was Evans who was instrumental in "softening-up" US Senator Conrad Burns (R-MT) to the policy of dam removal (Nielsen, 2005). And while the three-term Senator has never officially supported dam removal at Milltown, he has never publicly opposed it either. Burns currently serves as Chairman of the (Appropriations) Subcommittee on Interior and Related Agencies.

At the state level, Senator Dale Mahlum (R-35th) was identified as a key player in the process to remove Milltown Dam; specifically because of his environmental concerns about the Clark Fork and consistent pressure on former Governor Judy Martz (R) to endorse the dam removal alternative (Nielsen, 2005, Stone-Manning, 2005). Also in the state legislature, Representative Dick Hanes (R-63rd) was identified as one who "came on

board" to support dam removal at Milltown, primarily due to concerns over public safety (Nielsen, 2005).

VII. Fundamental Policy Change and Dam Removal on Montana's Clark Fork River

By late-2002, a steady stream of scientific findings from various government agencies had combined with dam removal campaigns at both the regional (e.g., the CFC, FOTR) and national levels (e.g., American Rivers, Trout Unlimited) to produce a near-unstoppable anti-dam coalition. Combined with political support to remove Milltown Dam from state lawmakers such as Sen. Mahlum and Rep. Haines and local officials such as Nielsen and Evans, these forces prompted the type of policy learning described by Sabatier and others as essential for dramatic policy change to occur (1993).[62] And viewed through the theoretical lens provided by Lowry (2003), the degrees of political receptivity had become sufficiently high – and augmented by readily apparent, significant, and widely recognized costs of maintaining the status quo – as to facilitate dramatic policy change.

These forces of policy change culminated in January 2003 when former Montana Governor Judy Martz (R) set precedent by calling for the dam's removal in her January 2003 State of the State address. And while Martz followed her somewhat unexpected announcement by saying she generally disapproves of removing dams or hydroelectric facilities, she did indicate the following.

"My thinking is that I should do what is right for today and for the long-term. With the dam in place, the risk of breach will be there forever. And once ARCO and NorthWestern sign off on the dam, the liability is on us. The failure of that dam would represent a massive liability for the taxpayers of Montana" – Devlin, 2003.

The following day, EPA announced that its forthcoming draft Milltown cleanup plan for Milltown would call for dam and sediment removal; in April 2003, EPA formally declared dam and sediment removal its preferred alternative. The final plan was issued in December 2004.

For its part, EPA cited the following reasons in its Record of Decision (ROD).

"This agreement will result in the cleanup of decades' worth of contamination caused by the downstream transport of mining wastes from extensive upstream operations in Butte and Anaconda. It will lead to safer drinking water for Milltown residents, improved native and sport fishing, local economic redevelopment, and improvement of conditions in the Blackfoot and Clark Fork Rivers in southwestern Montana. The agreement follows other settlements with Atlantic Richfield in the Clark Fork Basin under which cleanups will proceed and the state and federal governments' costs will be reimbursed. The parties plan to continue their negotiations in an effort to reach further agreements on the cleanup of other locations in the Clark Fork Basin contaminated by mining wastes" – (US EPA , 2005).

The Consent Decree was signed on August 2, 2005 by ARCO and NWC, along with the US EPA; US Department of Justice; the State of Montana; and the Confederated Salish and Kootenai Tribes. It calls for ARCO to bear the majority of the $100 million-plus cleanup of the Milltown Reservoir, via removal of roughly 2.5 million cubic yards of contaminated sediments. NWC is primarily responsible for the restoration activities related to the hydroelectric facilities, including the removal of the Milltown Dam. For its part, FERC granted a license surrender order to NWC; it took effect the day the Consent Decree was signed. The settlement also requires that both ARCO and NWC provide funds for historic preservation; Bull trout recovery; removal of the nearby Stimson Dam; mitigation for a State-owned bridge and highway; reimbursement for past and future federal response; and oversight costs related to the Milltown project (US EPA, 2005).

Dam Removal

At 8:00 a.m. on June 29th, 2006, the first physical step in Milltown Reservoir's restoration was initiated. The nearly $100 million project thus officially began; the dam's 42.5-foot-wide spillway gate was raised by a few inches. Throughout August, the gate was subsequently raised a bit more each day in order to permanently drawdown the reservoir by more than ten feet. As it drained, the sediments, contaminated with century-old mine and smelter tailings, located near the river's entrance into the reservoir were gradually exposed and the removal process began (IRN, 2006a). According to EPA's Milltown project manager,

"This is [was] the trigger that starts it all. To us technical people, this event is bigger than the consent decree. It marks the start of the actual mitigation" (Backus, 2006).

Notes

[1] Quote taken from Lowry 2004, 53.

[2] The ACOE operates 75 hydropower plants and the Bureau has 58.

[3] FERC's specific responsibilities include the regulation in the following areas: transmission and sale of natural gas for resale in interstate commerce; transmission of oil by pipeline in interstate commerce; transmission and wholesale sales of electricity in interstate commerce; licensing and inspection of private, municipal, and state hydroelectric projects; approving the siting of and abandonment of interstate natural gas facilities, including pipelines, storage and liquefied natural gas; ensuring the reliability of high voltage interstate transmission system; monitoring and investigation of energy markets; issuing of civil penalties and other means against energy organizations and individuals who violate FERC rules in the energy markets; overseeing of environmental matters related to natural gas and hydroelectricity projects and major electricity policy initiatives; and administering of accounting and financial reporting regulations and conduct of regulated companies (FERC, 2005).

[4] Federal Power Act (16 U.S.C. 791-828c; Chapter 285, June 10, 1920; 41 Stat. 1063) as amended by: Chapter 129, March 3, 1921; 41 Stat. 1353 – Chapter 572, June 23, 1930; 46 Stat. 799 – Chapter 687, August 26, 1935; 49 Stat. 803 – Chapter 782, October 28, 1949; 63 Stat. 954 – and Public Laws P.L. 247, October 31, 1951; 65 Stat. 701. P.L. 87-647, September 7, 1962; 76 Stat. 447. P.L. 95-617, November 9, 1978; 92 Stat. 3117. P.L. 96-294, June 30, 1980; 94 Stat. 611. P.L. 97-375, December 21, 1982; 96 Stat. 1819. P.L. 99-495, October 16, 1986; 100 Stat. 1243. P.L. 102-486, October 24, 1992; 106 Stat. 3097. P.L. 103-347, November 2, 1994; 108 Stat. 4585. P.L. 104-66, December 21, 1995; 109 Stat. 718.

[5] 1954 Phillips Petrochemical v. Wisconsin; and 1964 City of Colton v. SoCal Edison.

[6] Recently, FERC issued Order 2000 to foster participation in regional transmission organizations (RTOs) and Independent System Operators (ISOs), by establishing guidelines that a transmission entity must meet in order to qualify as an RTO. FERC's expectation was that the RTOs will increase efficiency in wholesale

energy markets and lower end-prices to consumers. Voluntary RTOs and ISOs were formed in New York , New England, Pennsylvania-New Jersey-Maryland, and the Midwest. Currently, FERC is reforming public utilities' open access tariffs to reflect a standardized wholesale market design. The expectation is that this will further reduce barriers to trade and enhance competition (FERC, 2005b).

[7] The notion of private ownership of water in the US is a common misnomer. Rather, a more accurate statement suggests that private individuals or groups may own a "right" to use a given quantity of water for a specified purpose.

[8] In addition, the 1992 the Energy Policies Act allotted so-called "wheeling authority" to the Commission, whereby it could permit the transmission of electricity by an entity not owning or directly using the power.

[9] The Electric Consumers Protection Act of 1986 (P.L. 99-495) repealed a requirement that FERC consider new license applications no earlier than five years before the expiration of an existing license.

[10] FPA (16 USC 791-828c), and implementing regulations (18 CFR Parts 4 and 16).

[11] An additional component of the 1986 ECPA targeted a lesser known component of hydroelectric generation. During the unstable energy climate of the late-1970s, Congress passed the Public Utility Regulatory Policies Act of 1978 (PURPA). Specifically, the Act created a new class of small, non-utility power generators (termed "qualifying small power facilities") from which utilities were required to buy a portion of their electricity. This expanded the participation of non-utility hydropower generators in the electricity market in an effort to demonstrate that electricity from non-utility generators could be successfully integrated with a utility's own supply. Regarding the environment, the 1986 ECPA precluded any such smaller facilities from being "qualified" at new dams and water diversions unless stringent environmental conditions were satisfied. Specifically, a project's PURPA classification was denied unless its contract terms protected fish and wildlife; FERC confirmed that it would not have a substantial adverse effect upon the environment; and FERC determined that its location was not upon a state or national wild and scenic river system, or any otherwise unique watercourse which a state have determined would be adversely affect by hydroelectric development. (Public Law 99-495).

[12] For a detailed discussion on attempts to commensurate disparate sets of environmental, socio-cultural, and historical values and units into a common metric – in order to execute the rational cost-benefit analyses and ensure the consideration of various alternatives and/or preferences about projected impacts – see Espeland (1998).

[13] Annual Gross Power Benefits are those which reflect the avoided cost of replacing a project's power generation and dependable capacity with power and equally reliable capacity from an alternative source. Annual Costs of Operation reflect past investments costs owed on the project, anticipated future investment costs, and current operation and maintenance costs. Annual Costs of Environmental Measures include those incurred with the introduction of operating conditions to relicensing decisions that are designed to protect, mitigate damages to, or improve environmental quality. These environmental measures may result in direct costs and/or reduced power values.

[14] Annual Benefits of Avoided Pollution are relative to alternative types of power generation, such as a coal-fired plant, since hydropower production generates less air pollution. FERC commonly discusses this avoided pollution as a benefit of hydropower projects. Annual Benefits of Project Services include those beyond power generation, such as flood control, water supply, irrigation, and navigation. Annual Benefits of Environmental Measures are referred to as "non-power" benefits, and include fish screens or changes in minimum flow requirements that may improve fish and wildlife resources, recreational opportunities, and/or other aspects of environmental quality.

[15] *Scenic Hudson Preservation Conference* v. *FPC* (1965).

[16] A host of amendments to the Federal Power Act (FPA) have produced particular sections that apply directly to environmental concerns and the relicensing process: Section 4(e), Section 10(a), Section 10(j) and Section 18. Each is described in more detail below (Source: NHA, 2006).

Section 4(e) applies to projects within a federal reservation, such as a National Forest or tribal lands. This section authorizes federal land management agencies (notably the Forest Service and the Bureau of Land Management) to issue mandatory conditions to include in the license to ensure that project operations do not interfere with the intended public use of the land. These conditions are referred to as Section "4(e) conditions" and are mandatory in that FERC must include them - as written - in the new license. Section 10(a) requires FERC to give equal consideration to power and non-power values to provide the "best public use of the waterway". This is commonly referred to as "balancing". In 1986, the Electric Consumers Protection Act amended the FPA to, among other things, include Section 10(j). Section 10(j) requires FERC to include in a new license such fish and wildlife terms and conditions as are recommended by state and federal fish and wildlife agencies unless FERC believes such "10(j) recommendations" may be inconsistent with the purposes and requirements of the FPA. FERC and the agencies must attempt to resolve inconsistencies between 10(j) recommendations and the FPA. If FERC does not adopt a 10(j) recommendation, it must publish a finding that (a) the recommendation is inconsistent with the FPA and (b) the conditions of the new license otherwise will protect and enhance fish and wildlife. Section 18 requires FERC to order the construction, operation and maintenance of fish-ways prescribed by the Secretary of Interior (US Fish & Wildlife Service) or Secretary of Commerce (National Marine Fisheries Service). A "Section 18 prescription" is considered mandatory and may not be rejected or altered by FERC. Either Secretary may reserve authority to prescribe fish-ways some time later in the license term; if so, FERC will reserve its authority in the license to require fish-ways if subsequently prescribed by either Secretary.

[17] The USGS collects and publishes scientific data on the nation's natural biological and physical resources – including rivers. USGS operates flow gages and undertakes other research and monitoring programs that collect scientific data regarding the resources affected by licensed projects. A licensee or other agency may contract with the USGS for the collection of scientific data or for the design of a hydrologic or biologic monitoring program or fish passage facility.

[18] FPA, Sections 4(e), 10(j) and 18. Also, the MFCMA is also known as the Magnuson Fishery Conservation and Management Act of 1976.

[19] For detailed, step-by-step accounts of the traditional process of FERC licensing and the more contemporary alternative processes, see the Hydropower Reform Coalition's *Citizens Toolkit for Effective Participation in Hydropower Licensing* (2005), available at http://www.hydroreform.org/EPA.asp

[20] On February 21, 2006, the US Supreme Court will for the first time begin hearing oral arguments *in S.D. Warren v. Maine Board of Environmental Protection*. In this case, brought by a South African-owned paper company that owns several dams on Maine's Presumpscot River, the hydropower industry is attempting to overturn a 35-year old provision in the Clean Water Act that gives states the right to protect their rivers from water quality problems caused by hydropower dams. Five dams on the Presumpscot River operate in instantaneous run-of-river mode. Dam owner S.D. Warren contends that because the dams do not directly pollute the water as it passes through the dam, the release of water by the dam is not a "discharge." Specifically, the Court agreed to hear only one question presented by the case: Does the mere flow of water through an existing dam constitute a "discharge" under Section 401, 33 U.S.C. $ 1341, of the Clean Water Act? This is despite an earlier ruling that a discharge requires the addition of water from a distinct body of water. It has been the long-held practice that a dam release constitutes a discharge, triggering Section 401 of the Clean Water Act. Section 401 authorizes states to certify that the federal project (here, a federally-licensed hydropower dam) will meet the state's water quality standards, or withhold the certification and prevent the project. In this particular case, the state of Maine has certified the dams with the condition that they meet certain conditions, such as constructing devices for fish passage and keep dissolved oxygen (i.e., water quality) at healthy levels in the water (HRC, 2006d).

[21] Section 18 of the FPA requires FERC to order the construction, operation and maintenance of fish-ways prescribed by the Secretary of Interior (US Fish & Wildlife Service) or Secretary of Commerce (National Marine Fisheries Service). A "Section 18 prescription" is considered mandatory and may not be rejected or altered by FERC. Either Secretary may reserve authority to prescribe fish-ways some time later in the license term; if so, FERC will reserve its authority in the license to require fish-ways if subsequently prescribed by either Secretary (NHA, 2006).

[22] FPA, Sections 10(j) and 10(a).

[23] In international maritime law, an Exclusive Economic Zone (EEZ) is a seazone over which a country has special rights over the exploration and use of marine resources. Generally a country's EEZ extends to a distance of 200 nautical miles (370 km) out from its coast, except where resulting points would be closer to another country.

[24] As of February 2006, the MSA is currently up for congressional reauthorization. In December 2005, a new round of MSA amendments were proposed in a reauthorization bill introduced by Senators Ted Stevens (R – AK) and Daniel Inouye (D – HI), the chair and ranking remember (respectively) of the Senate Commerce Committee, which is responsible for fisheries oversight. The amendments would maintain the law's current environmental standards and for the first time, require regional fisheries managers to impose an enforceable limit on the amount of fish that can be caught in the waters they oversee, with a penalty if the cap is surpassed.

[25] FPA, Sections 10(a); 10(j); and 18.

[26] The federal government owns roughly 635 million acres of land, about 28 % of the total US land mass. More than half of the lands in many western states are federally owned (e.g., AK, ID, NV, OR, UT, WY), while more than a third in others are federally owned (e.g., AZ, CA, CO, NM) (Rosenbaum, 2005).

[27] The BLM administers federal lands not included in National Parks, National Fish and Wildlife Refuges, or National Forests. Under FPA section 4(e), it may prescribe mandatory conditions for any such lands set aside as a federal reservation. Under FPA section 10(a), BLM may also recommend conditions for a hydropower project's use of other lands and associated waters (HRC, 2005).

The BIA seeks to enhance the quality of life, promote economic opportunity, and carry out the responsibility to protect and improve the trust assets of Indian Tribes. Under FPA section 4(e), the BIA may prescribe mandatory conditions for the protection and use of Tribal reservations occupied by a project. BIA may recommend other conditions under FPA section 10(a) to protect Indian reservations and trust assets from any adverse effects of other projects (HRC, 2005).

[28] The Multiple Use-Sustained Yield Act and National Forest Management Act (16 U.S.C. 797b, 823b).

[29] FPA, Section 10(a).

[30] FPA, Section 10(a).

[31] FPA sections 10(a) or (j).

[32] The precedent-setting removal of Edwards Dam on Maine's Kennebec River emerged from a bitterly divided FERC. See FERC. 1997. Edwards Mfg. Co. 81 FERC ¶61,225.

[33] HRC's platform is available at:
http://www.hydroreform.org/SupportingFiles/documents/HRC_Platform.pdf

[34] HRC reported the following (as of February 7th, 2006): American Fork Project, UT; Elwha River and Glines Canyon Dams, WA; Fossil Creek Dam, AZ; Kennebec River, ME; Wood Creek Project, MI; Mokelumne Project, CA; Condit Dam, WA; and the proposed Star Falls Project was rejected.

[35] The Fort Edward Dam and hydropower plant on New York's Hudson River were removed in 1973 by the Federal Power Commission (FPC) – prior to it being renamed FERC in 1977. The FPC conducted one of its first EISs on the proposed removal of Fort Edward Dam and pursuant to this review, it approved the removal in 1973. This early case of dam removal is significant for a number of reasons. Most significantly, pursuant to hearings conducted by the FPC, the dam owner, the Commission, and state and local officials were found not to have exercised due diligence in planning for and completing the dam removal. Significant water quality problems were also created by PCB-contaminated sediments released from behind the dam. In 1976, New York State closed the Hudson River for fishing, decimating a $40 million striped bass fishery. In 1977 and 1978, approximately 180,000 cubic yards of contaminated sediments were removed from the river by the state. And in 1983 the EPA declared a significant stretch of the river a federal Superfund site due to the PCB contamination. EPA and New York State Department of Environmental Control continue to evaluate options for addressing this extensive PCB contamination. Full remediation has yet to be completed (American Rivers, 2006b).

[36] The Edwards Dam was a 24-foot tall and 917-foot wide rock-filled timber crib structure. It was built in 1837 to facilitate upstream navigation and provide mechanical power to saw mills.

[37] In May of 1998 a settlement agreement among all parties directly involved provided for the transfer of ownership of Edwards Dam to the State of Maine for the purpose of removal. The deal was brokered by Maine governor Angus King, and essentially relieved Edwards Manufacturing Company of the liability for the dam's removal, in exchange for the company transferring ownership to the state and providing $100,000 to the City of Augusta, ME for development of a riverside park on the property where the powerhouse had been located. Initially, FERC had ruled that the dam's owner assume full financial liability. The subsequent agreement provided that the costs of dam removal and other related fish restoration efforts (at total of $7.25 million) would be financed by upriver dam owners in exchange for a delay in their fish passage obligations and by a shipbuilder downstream in exchange for a permit to expand its shipbuilding operations (Bath Ironworks). It was specified that upstream hydropower operators, including the Central Maine Power Company, which had previously purchased hydroelectricity from Edwards, were to pay $4.75 million toward dam removal, while buying a deadline extension of up to sixteen years for the installation of fish ladders on other dams. Additional funds came from the shipbuilder Bath Iron Works, which was slated to pay $2.5 million to compensate for environmental impacts on the river involved in its planned 15-acre expansion farther South in the city of Bath, ME. Furthermore, the nonprofit National Fish and Wildlife Federation, which will manage the river restoration process, sought and obtained $1.5 million in private donations.

[38] The following were FERC-regulated dams that have been removed. The Columbia Falls hydroelectric Dam on the Pleasant River on Maine's coast was removed from 1990-1998. It is home to one of the last wild spawning grounds for the endangered Atlantic salmon. The Grist Mill Dam on Maine's Souadabscook Stream was removed in 1998.

[39] Wisconsin has removed more dams than any other state – mostly small mill dams or obsolete hydroelectric dams removed by their owners with oversight from the state Department of Natural Resources (Born et al. 1998). Pennsylvania, Ohio, Connecticut, and Maine have also removed a significant number of dams.

[40] E. Grossman, author of *Watershed: The undamming of America* (2002), as quoted in Downing, J. (2004).

[41] Montana's Milltown Dam removal order by FERC is the subject of the in-depth case study in Chapter 9.

[42] Doyle et al., 2003. Information on statues was collected from reviews of state codes relevant to dams and waterways, and by contacting relevant personnel in state agencies with primary responsibility for dam management. Other states in the western US without such statutes include Alaska, Colorado, New Mexico, South Dakota, Nebraska, and Oklahoma.

[43] On March 7, 2007 the Washington Department of Ecology, Shorelands and Environmental Assistance Program (ESEAP) granted (an important) approval to facilitate dam removal. ESEAP issued the Section 401 Water Quality Certification, which is a federal Clean Water Act permit, certifying that the dam removal and ecosystem restoration project will meet state water quality standards and other water protection regulations. Without ESEAP's certification, the US National Park Service – which is the lead federal agency for the Elwha River Restoration Project – could not secure other essential permits or hire contractors who will lay the groundwork for the removal of the Elwha and Glines Canyon Dams (Washington Department of Ecology, 2007).

[44] Removing the two dams is expected to increase the amount of silt in the river, by releasing some 18 million cubic yards of dirt and gravel that have been trapped behind the dams over the last 93 years. To mitigate the imminent changes, the federal government will fund $70 million in civil works, including a new water-treatment plant for the town of Port Angeles, WA, and a new sewer system, a raised flood-protection levee, and a fish hatchery for the Lower Elwha Klallam Reservation, located at the mouth of the river.

[45] Hydroelectric power accounts for approximately ten percent of the total electricity used in the entire United States.

[46] PGE utilized FERC's alternative licensing process for the Bull Run Project. This meant involving stakeholders early in the process to establish a systematic public process for developing an administrative record and combining the pre-filing consultation process with the FERC's post-filing NEPA environmental review process.

[47] The major participants included APS, US BOR, US FWS, Arizona Game and Fish Department, the Yavapai-Apache Nation, American Rivers, Arizona Riparian Council, Center for Biological Diversity, The Nature Conservancy, Northern Arizona Audubon, and Northern Arizona University.

[48] As part of the preparations to restore the creek's full flow, the US BOR, US FWS, USFS, and the Arizona Game and Fish Department conducted a native fish restoration project. Completed in the spring of 2005, the project included the removal of nonnative species and construction of a fish barrier to keep nonnative fish from entering the restored area.

[49] These species include the speckled dace, desert suckers, and an enigmatic chub (*Gila "robusta"*) population. Fossil Creek has one of only a few populations of this chub which is morphologically intermediate between roundtail chub (*Gila robusta*) and Gila chub (*G. intermedia*) whose taxonomy is yet to be resolved. In addition, Native Arizona fishes are among the most endangered group of aquatic species in the United States. Twenty of the 35 native species (54%) are listed as either endangered or threatened (WREP, 2006).

[50] As an example of such deregulation, in the 2000 Energy Policy Act, now Section 32 of the Federal Power Act, Congress authorized the delegation of regulatory authority over hydropower 5MW or less from FERC to the State of Alaska. Before the authority can be transferred, FERC must approve the state's program as "equivalent" to the federal program. The Regulatory Commission of Alaska (RCA) published proposed rules in March 2005. These rules are especially important given the number of new dam proposals currently pending in Alaska and the possibility of Congress granting States similar program authorities (HRC, 2006b).

[51] HRC (2005b).

[52] Specifically, any party may dispute all "issues of material fact with respect to any condition or prescription filed by a bureau" (Title 23, §45.21 p. 73).

[53] For a list of projects and rivers potentially harmed by this process, see HRC (2006c).

[54] On February 21, 2006, the US Supreme Court will begin hearing oral arguments *in S.D. Warren v. Maine Board of Environmental Protection*. The Court agreed to hear only one question presented by the case: Does the mere flow of water through an existing dam constitute a "discharge" under Section 401, 33 U.S.C. $ 1341, of the Clean Water Act? This is despite an earlier ruling that a discharge requires the addition of water from a distinct body of water. It has been the long-held practice that a dam release constitutes a discharge, triggering Section 401 of the Clean Water Act. Section 401 authorizes states to certify that the federal project (here, a federally-licensed hydropower dam) will meet the state's water quality standards, or withhold the certification and prevent the project. Without Section 401, states will be able to make recommendations to the federal manager (FERC), but not mandate actions to protect water quality standards. In this particular case, the state of Maine has certified the dams with the condition that they meet certain conditions, such as constructing devices for fish passage and keep dissolved oxygen (i.e., water quality) at healthy levels in the water (HRC, 2006d).

[55] Sites are first proposed to the National Priorities List (NPL) in the Federal Register. EPA then accepts public comments on the sites, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing. Specifically, Section 300.425(c) of the National Contingency Plan (NCP), the federal regulation by which CERCLA is implemented (55 FR 8845, March 8, 1990), provides three mechanisms for placing sites on the NPL The first is EPA's Hazard Ranking System (HRS). The second allows states or US territories to designate one top-priority site regardless of score. The third allows listing a site if it meets all three of these requirements: 1) the Agency for Toxic Substances and Disease Registry (ATSDR) of the U.S. Public Health Service has issued a health advisory that recommends removing people from the site; 2) EPA determines the site poses a significant threat to public health; and 3) EPA anticipates it will be more cost-effective to use its remedial authority (available only at NPL sites) than to use its emergency removal authority to respond to the site (US EPA, 2006).

[56] According to a recent report, ARCO hired Dr. R. Wilson, a Harvard professor, in 1990 to demonstrate that arsenic did not cause cancer in humans at low levels. However, after reviewing the available data and consulting with other researchers, Dr. Wilson quickly reached the opposite conclusion – that arsenic was actually more carcinogenic than EPA had suggested. He recommended that the federal standard immediately be lowered from 50 to 20 parts per billion. ARCO was not pleased with these findings and company officials canceled his research project and blocked publication of his results for several years. ARCO consultants then hired Dr. G. Marshall – a Chilean scientist researching the link between arsenic and cancer – to produce results that helped the company. In the end, ARCO was unsuccessful in suppressing scientific knowledge on the risks of arsenic (CFC, 2002; (WSJ 2001).

[57] This amount of energy represents roughly one-tenth of one-percent of Montana's needs.

[58] MPC ultimately morphed into a telecommunications company (Touch America) via sell-off of its transmission lines and hydroelectric facilities.

[59] Today BDG is a self-described "proactive, grassroots organization of west Montana community residents who work cooperatively to promote growth that will achieve a balance between the native beauty of the community environment and the commercial, residential, and industrial development that brings employment, prosperity, and infrastructure support" (State of Montana, 2005).

[60] Arsenic levels were found to be six times greater than concentrations found in sediments slated for cleanup in Lake Michigan. Copper ore is oftentimes rich in arsenic and the processing and smelting of the rock releases arsenic as tailings and into the air. The richest deposit of copper sulfide ever extracted was located at the headwaters of the Clark Fork River, near Butte, MT (Devlin, 2002).

[61] The mission of FOTR is to, "promote the removal of the Milltown Dam and sediments in the Milltown Reservoir; educate the two rivers communities on the science behind the removal proposal; represent the opinions of those in the communities that seek removal by working with the media, Environmental Protection Agency (EPA), state and local government; further the ecological and recreational values of the Blackfoot and Clark Fork Rivers; and promote a safe, healthy and enriching environment for the communities of the two rivers" (FOTR, 2005).

[62] According to the ACF, the primary force affecting policy change is termed policy learning. Policy learning alters secondary aspects of a coalition's belief system. This involves relatively enduring alterations of thought or behavioral intentions that result from experience and/or new information and that are concerned with the attainment or revision of policy objectives. This process involves increasing knowledge and the changing of perceptions regarding probable impacts of alternative policies. The following statement in regards to Governor Martz' surprise announcement effectively captures this phenomenon. According to director of EPA's Montana office, "I think it was the step-by-step collection of information and the realization that a whole lot of things could be accomplished – and without causing an environmental problems as a result of doing the cleanup" (Devlin, 2003).

CHAPTER 7

Introduction

In this Chapter, the individual case studies from each of the three federal jurisdictional contexts are analyzed in greater detail and compared relative to the general findings and hypotheses offered by Lowry (2003). Similar to the progression of Chapters 4 – 6, the ACOE is analyzed first; this is followed by the BOR and FERC. Table 7.1 presents a brief comparison of the cases studied in this dissertation with those used by Lowry (2003) to differentiate between cases of fundamental policy change (e.g., dam removal) and those in which relatively minor or disjointed policy changes emerged.[1] Cases are compared along the two primary dimensions of the theoretical framework political receptivity and physical complexity.

For each jurisdictional context, analysis begins with a brief review of the six general criteria which have prompted previous dam removals discussed in Chapter 2 (e.g., environmental impacts; social impacts; economics and cost-benefit analyses; marginal benefits from continued operations; and changes in public opinion over the perceived permanence of dams). Each case study is then analyzed through the lens provided by Lowry's framework; the relevancies of the additions proposed in this dissertation are also assessed in each context.

Table 7.1 – Fundamental versus (minor) Disjointed Policy Change

River	Primary Regulatory Jurisdiction	Political / Coalition Receptivity to Change	Decision-making Venue Tolerant of Change	Costs of Status Quo High and Significant	Scientific Consensus on Benefits of Change	Physical Complexity of Change (jurisdictions; decision points)	Outcome
Lowry (2003)							
Neuse	State of North Carolina[2]	High	High	High / moderate	High	Low	Fundamental Change, Dam Removal
Kennebec	FERC	Moderate / high	Moderate	High	High	Low	Fundamental Change, Dam Removal
Missouri	ACOE *and* BOR	Low	Low	Moderate	Moderate	High	(minor) Disjointed Change
Snake	ACOE	Low	Low	High	Moderate / high	High	(minor) Disjointed Change
Clark (2006)							
Elk Creek	ACOE	Low	Low	High	High	High / moderate	(minor) Disjointed Change, Policy Stasis
Rogue	BOR	Low / moderate	Low / moderate	High	High	High	Fundamental Change, Dam Removal
Clark Fork	FERC	Low / moderate	Moderate	High	High	High	Fundamental Change, Dam Removal

I. Federally Owned / Operated Dams and Pork

"Public works projects have been singled out as especially pork-laden, perhaps most notable among them the Army Corps of Engineers" – Hird 1991, 429.

As the commercial interests profiting from the services provided by ACOE (and later BOR) dams steadily increased during the ninetieth and twentieth centuries, so too did the number and strength of professional organizations lobbying for their construction. In fact some suggest that the first water development lobby group in the US was created in 1901 to lobby for ACOE projects (McCully, 1996).[3] This initial support came from local trade and industry bodies, barge owners, political elites, and cities in need of flood

control. Together with these early constituencies, water supply utilities and agribusiness interests would combine into a powerful force in the lobbying of elected officials for funding and continued water development. And in the US Congress, the time-honored practice of *quid pro quo* or pork-barrel politics quickly took root in this domain, as members jostled to secure federal funds and water projects in their home districts and states. In particular, this practice of trading votes has been perhaps most prevalent in the arid American West, where congressional delegations have notorious records of trading votes to secure federal dams in their respective states (Reisner, 1993; Maass, 1951).

Indeed for decades, a host of scholars has portrayed ACOE and BOR water projects as the pork *par excellence* for US politicians (McCully, 1996; Reisner 1993; Clarke and McCool, 1986; Freejohn, 1974; Drew, 1970; Maas, 1951). And while the 'pork barrel' in politics has been variously defined, a common thread involves the practice of certain legislators, by virtue of committee positions, to gain funding for their districts or states at the expense of the nation as a whole.[4] Characteristic of pork barrel politics, water projects were (and continue to be) easy to justify and linked to multipurpose socioeconomic development; planned on regional bases to benefit limited constituencies; hugely expensive yet publicly subsidized; and constructed by powerful federal agencies (which may shield information from the public and defeat most opposition).[5]

In addition, pork-barrel water development projects are often environmentally destructive and extremely questionable in terms of cost-benefit ratios and their overall value to society at large. Nevertheless, such projects are a primary ingredient for pork

barrel politics and have been shown to effectively galvanize support of incumbent congresspersons on a regional basis (Clarke and McCool, 1996; Reisner, 1993).

II. The ACOE in Dam Limbo at Elk Creek

The Elk Creek case study described in Chapter 4 meets five of the six general criteria which have prompted previous dam removals discussed earlier in this paper (e.g., pages 4-12).[6] These include concerns related to environmental impacts; social impacts, including the effects of salmon decline and/or extinction on traditional practices of Native Americans; economics and cost-benefit analyses; marginal benefits from continued operations; and changes in public opinion over the perceived permanence of dams.

Beyond these general criteria, the peculiar history of Elk Creek Dam is symbolic of the impediments and idiosyncrasies inherent in the political dynamics of policy change. Despite widespread recognition of the economic and environmental consequences of maintaining the status quo, the unfinished, useless, and increasingly-obsolete dam has remained for nearly twenty years. Each year, the functionless dam consumes roughly $300,000 of American tax revenues for a variety of purposes; these include less-than-certain fish recovery, security, maintenance, and weed control. In addition, a host of aquatic resources are needlessly harmed each year by a structure that provides nothing beneficial in terms of power, water storage, flood control, and recreation. On top of this the dam's owner, a federal agency described by McCool (2004) as "the Dams-R-Us agency", was *forced* to initiate its construction. Since construction was stopped in 1987, the Corps has expressed absolutely no desire to pursue its completion and has in fact lobbied for its breaching for at least the past ten years.

Why has this instance of river restoration failed to produce a more fundamental and lasting policy change?

ACOE and the Elk Creek Case in Lowry's (2003) Framework

In each case examined by Lowry (2003), there existed at least two main coalitions of interests; one favored dramatic policy change via efforts to fundamentally restore river conditions, and the other favored maintenance of the status quo via efforts to limit the extent of policy changes. The cases analyzed here exhibit a similar structure; Table 7.2 provides a summary of the major players in each of the competing coalitions.

When situated specifically in the context of Lowry's framework and explanation for different magnitudes of policy change, a number of interesting observations emerge from the Elk Creek case study. These initial observations lend both support and uncertainty to his pioneering work and thereby suggest avenues for additional inquiry into the political dynamics of dam removal involving river restoration. On the surface, Elk Creek seems to represent a case ripe for dramatic policy change; beneath this surface, there exist significant impediments to change that have thwarted restoration efforts involving policy change of a high magnitude.

Political Receptivity to Breaching Elk Creek Dam

For observations which generally parallel those of Lowry (2003), the Elk Creek case has been defined by a constant succession of policymakers that have been largely ill-receptive to the dam breaching option. At the local level, a series of county commissioners and other politicians have provided their constituents with support for maintaining the dam (Klatte, 2005; Hunter, 2005). In response to the view of many local residents that a completed Elk Creek Dam will one day be essential for the region's

continued economic development, these locally-elected representatives continue to express little receptivity to the notch-based proposal, despite ACOE's preference to pursue the opposite.

Regarding the individuals who have been elected to represent the region's interests at the national level, there has been a similar, long history of low receptivity to dramatic policy change. Rooted in the domain of pork-barrel politics, the initial source of steadfast support for Elk Creek Dam came from five-term US Senator Mark Hatfield (R-OR). Between 1967 and 1997 Hatfield promised to constituents that he would get the funding to build Elk Creek Dam; when the Corps recommended against its construction, Hatfield nevertheless inserted money for the dam in an appropriations bill (McCool, 2004). And while Senator Gordon Smith (R-OR) has been less unreceptive to change (at least outwardly), he has yet to take action in support of the notch-based option since he was first elected to the US Senate in 1977.[7]

A number of counterparts to Hatfield and Smith in the US House of Representatives have exhibited similarly low degrees of political receptivity and outright hostility to the proposed notching of Elk Creek Dam. Firmly rooted in the domain of pork-barrel politics, enduring support for keeping the unfinished dam has come from Representative Bob Smith (R-OR 2nd). In fact by one account, congressman Smith approached his colleague Joseph McDade (R-PA), former chairman of the Energy and Water Development Subcommittee (Appropriations Committee), and demanded his assurance that the Corps would be prevented from reprogramming existing monies in its budget toward notching at Elk Creek (Jacobson, 1998). In addition, this unreceptive posture towards the more dramatic policy change continued in Oregon's second district

when Representative Greg Walden was elected to the seat vacated by Smith in 1999. Walden would go on to ensure that the Corps was prohibited from implementing its preferred alternative for the dam when he succeeded in inserting the anti-notch rider into the 2003 omnibus legislation.

Table 7.2 – Competing Advocacy Coalitions at Elk Creek (1986 – 2006)

Pro-Dam • Keep unfinished dam; secure funding for permanent trap-and-haul fish passage; lobby for ultimate completion.	**Anti-Dam** • Remove (notch) unfinished dam; secure funding for notch-based dam restoration project.
(former) US Senator Mark Hatfield (R-OR)	US ACOE
US Senator Gordon Smith (R_OR)	US FWS
US Representative Greg Walden (R-OR 2nd)	US NMFS
(former) US Representative Bob Smith (R-OR)	US BLM
State Representative Dennis Richardson (R-OR 4th)	US NPS
State Representative Gordon Anderson (R-OR 3rd)	Oregon Department of Fish and Wildlife
State Representative Debi Farr (R-OR 14th)	Oregon Natural Resources Council
State Representative Bill Garrard (R-OR 55th)	Consortium of more than fifty conservation, commercial, and fishing organizations
State Representative George Gilman (R-OR 55th)	American Rivers
State Representative Susan Morgan (R-OR 2nd)	WaterWatch of Oregon
House of Representatives, Oregon's 72nd Legislative Session	(former) Oregon Governors Roberts and Kitzhaber
Rogue River Basin Association	Republicans for Environmental Protection, Oregon Chapter
Martin Bauer, President, Rogue River Basin Association	
(current) Jackson County Commissioners (3)	
(former) Jackson County Commissioner Sue Kupillas (OR)	
City of Shady Cove, OR	

Coalition Interactions

As discussed at the end of Chapter 4 and above, the interaction of advocacy coalitions in the Elk Creek case has been and remains fairly hostile and major policy change has not emerged. The impact this persistence of two equally-matched advocacy coalitions has on thwarting the policy learning necessary for change cannot be underestimated. The dam was first authorized by Congress in 1962 yet by the time ACOE had refocused its attention on the site in 1980, it quickly recommended against

completion due to an unacceptable incremental cost-benefit ratio (Buck, 2005). Shortly thereafter, a GAO report confirmed the Corps' earlier analyses that projected the cost-benefit ratio associated with Elk Creek at five-to-one; every $5 spent on the project would return roughly $1 of conceivable economic benefits. In addition, ACOE maintained that the initial primary purpose of the dam, flood control, was no longer needed due to completion of the 327-foot-high Lost Creek Dam in 1977 and the 249-foot-high Applegate Dam in 1980 (ONRC, 2005).

Nevertheless, local support for the dam's completion endured and has been amplified in Congress by a series of Oregon's Senators and Representatives. And despite ACOE's previous decision to stop budgeting for the dam, Oregon's former, five-term Senator Mark Hatfield successfully secured a $15 million appropriation from Congress to initiate construction (ONRC, 2005). Led by the Oregon Natural Resource Council and other conservation groups, the anti-dam coalition mobilized; it filed a string of lawsuits in federal court and was successful in lobbying two of the state's former governors (Roberts and Kitzhaber); the state's Department of Fish and Wildlife; the US FWS; the USFS; the US BLM; and the US NMFS to all support the proposal to fully breach the unfinished dam.

Additional Factors and Political Receptivity to Change

Lowry (2003) posits an additional set of "important and observable conditions regarding the interaction between different advocacy coalitions that enhance receptivity to change proposals" (16). Specifically, a collection of three conditions are said to enhance the receptivity of coalition interactions toward policy change.

Decisionmaking Venue and Tolerance for Change

The first assesses whether the primary locus of decisionmaking is tolerant of change. Lowry (2003) maintains this is crucial since there exists variation among different venues in terms of receptivity to change; this variation will in large part determine the viability of strategic behaviors available to change advocates (e.g., Schattschneider's (1960) "socialization of conflict" and "venue shopping by strategically minded political actors" as discussed by Baumgartner and Jones (1993)).

Based on its jurisdiction, the situation at Elk Creek represents a case involving restoration and potential dam breaching in the federal context; Congressional authorization is absolutely essential for dramatic policy change to ensue. And when a proposed dam removal would require Congressional action, the likelihood for such a dramatic policy change is slim, if not utterly out of the question. In fact, Lowry (2003) found that as a venue in which coalition interactions must transpire, the US Congress is largely unreceptive to dramatic policy change proposals (228-230). In particular, he found that when, by necessity, coalition interactions transpire in Congress and/or by proxy via elected representatives, policy efforts were stymied because defenders of the status quo were (and continued to be) positioned to effectively stall meaningful and significant policy in this venue. The twenty-plus-year limbo-esque status of the Elk Dam supports the hypothesis that receptivity to change increases if decisionmaking occurs in venues that are tolerant of change proposals.

An additional element of support for this reasoning comes from Derthick and Quirk's (1985) study of federal deregulation of the US telecommunications industry; the necessity for Congressional action was identified as a major constraint on promoting

policy change. Specifically, Derthick and Quirk (1985) identified both normal (e.g., built-in) and additional (e.g., as evidenced through their study of deregulation) obstacles to dramatic policy change. Regarding the former, it was argued that in a free and diverse society such as the US there are few significant restraints on the ability of various groups to mobilize and thus promote their many disparate interests. By extension, the systems of policymaking in the US (especially Congress) are accessible and designed to work slowly (i.e., incrementally), responding only when a high level of agreement has been achieved. As a result, implementation of policy change agreements is difficult because of the extreme organizational fragmentation associated with federalism and a complex mix of the public and private sectors. Additional obstacles to policy change evidenced in their research include the difficulties inherent for attempts to both reverse long-established government policies and profoundly alter the routines of federal agencies.

Similarly, as a venue not always receptive to dramatic policy changes, Congress also offers the opportunity for proponents of the status quo to engage in strategic behaviors in order to protect anti-change interests (Lowry, 2003). In the Elk Creek case, the particular significance of strategic use of the rider in Congress was evidenced (particularly non-germane riders in the Senate) as a method to hinder or prevent dramatic policy change from transpiring. The current status of Elk Creek Dam, in view of the primary decisionmaking venue and Congress' generally low political receptivity to change, clearly lends support to Lowry's conclusion regarding the obstacles to dramatic policy change.

Costs / Benefits of Status Quo versus Policy Change: Scientific Consensus?

The second and third conditions identified by Lowry (2003) that can enhance the receptivity of coalition interactions toward policy change are very much interrelated. One assesses whether the costs (both economic and environmental) of the status quo are high and readily apparent. The other assesses the degree of consensus on data and existing research on the potential benefits of policy change. Taken together, these two conditions inform his hypothesis that receptivity to proposals for change increases if a) the costs of maintaining the status quo are higher and more apparent, and b) diverse interests share accurate and science-based information on future potential benefits regarding change proposals. In the Elk Creek case, both conditions are readily identifiable; when taken together, fail to support his hypothesis. Consider the following.

The status quo at Elk Creek Dam has been costly and few (if any) benefits have been the result. A recent estimate suggests that more than $120 million has been spent on Elk Creek Dam since it was first authorized in 1962 and that it will cost at least an additional $70 million to complete the project and bring the dam to its initially-proposed 249-foot height (ORNC, 2005). In addition, a US GAO report maintains that the project's benefits were overstated from the start and if taxpayers are forced to finance the dam's completion, they should expected an estimated return of about ¢.20 for each dollar spent (Hunter, 2002). In fact, local Rogue River fishermen have long joked that the sole purpose of Elk Creek Dam is to kill salmon. According to Hunter (2002),

"If dam advocates have their way, they may have found another giant drain down which to pour more federal tax dollars ... We just can't afford to squander more money, and salmon, on absurd Elk Creek Dam schemes".

A sentiment similar to this emerged during a series of personal interviews I conducted during August 2005 with local conservation groups and ACOE personnel in both Portland, OR and at the Elk Creek dam site, located between the southern Oregon cities of Grants Pass and Medford. Thus, it appears a near-unanimous consensus exists on the significant environmental consequences and economic costs of maintaining the status quo at the dam (e.g., Hunter, 2005; Klatte, 2005; Buck, 2005). However, the same cannot be said for political consensus on the costs of continuing the status quo.

Since 1992, this status quo has involved operation of a 'trap-and-haul' system whereby migrating salmon are confined and collected at the dam's base, transported by vehicle around the dam, and released a few miles upstream above the dam. Annually, this costs the federal government roughly $350,000 (Latté, 2005). Federal guidelines require that the traps be checked daily for fish from October 1 to the end of May; during the height of the spawning season, the process is required several times each day (Klatte, 2005).

Originally, this trap-and-haul policy was planned and thus designed to last an estimated five years (or until salmon stopped appearing at the dam); enhanced hatchery operations elsewhere would mitigate the planned elimination of the particular salmon run on Elk Creek. Since the system was first implemented in 1992, wildlife biologists have found that hatchery fish are not as robust and genetically-pure as wild ones and the 1997 listing of Coho under the ESA made it clear to the Corps that a permanent solution was needed (Klatte, 2005; Buck, 2005). The trap-and-haul system also requires for the salmon to be excessively handled, which has been widely criticized for inflicting unnecessary stress on the fish and increasing rates of mortality (Klatte, 2005; Buck,

2005). In addition, the lifespan of the existing system has long-since expired and its operations are hindered by the wildly fluctuating and debris laden flows of Elk Creek.[8]

To address these concerns, the notch-based proposal endorsed by the ACOE would cost an estimated $7 million to perform and require an additional $8 million for restoration and re-channelization activities along the river's left bank (Klatte, 2005). In comparison, a new and permanent trap-and-haul system, whereby fish would be transported around the dam without physical handling (e.g., a "water-to-water transfer"), would cost an estimated $8 million for design and construction. An additional $2 million would be required for ongoing biological monitoring and an annual operating expenditure of $150,000 would also be required. According to the ACOE, the cost of notching would therefore become slightly cheaper than the trap-and-haul cost after just ten years and after fifty years would result in forty-percent savings (Klatte, 2005).

Despite its efforts over the past ten-odd years to abandon this ill-fated project and provide a free-flowing Elk Creek, the ACOE was officially instructed not to notch the dam in February 2003. Rather, a provision in the 2003 House Energy and Water Appropriations instructed the agency to formulate and complete an expanded version of the outdated trap-and-haul system that would transport migrating salmon past the dam for the next several decades. In large part, this development came from the success of Representative Walden in ensuring that a rider he attached to an omnibus bill emerged intact from the House-Senate Conference Committee. Despite thousands of conservationists' pleas to US Senator Gordon Smith (R-OR) and others in Congress, the bill was signed into law by President GW Bush on February 20, 2003.

The bill allotted the agency $1 million that year to cover the roughly $500,000 cost for fish hauling, maintenance, and security at the dam. What remained went toward initial work on the design and consultation with federal fish managers over potential impacts to the local population of threatened Coho salmon (Freeman, 2003). Since funds do not come near the amount necessary for construction and long-term management, the Corps initially estimated that the new plan would require at least two additional Congressional appropriations before it could be completed for operation by Fall 2006 (Freeman, 2003). Various estimates rate the new trap-and-haul system's preliminary design at between thirty- and forty-percent complete, with significant delays caused by the absence of Congressional funding in 2004 and the overall fallback of funding to annual operating costs.

Taken together, the aforementioned economic and environmental costs of Elk Creek Dam, and their widespread acceptance in scientific and administrative communities, defy the otherwise commonsensical proposition of Lowry (2003) – when the costs of the status quo are widely known and there exists widespread agreement within the scientific community on the dangers of its continuance, dramatic policy changes are more likely. In the case of Elk Creek – an unfinished project that produces no tangible benefit to society – there has been and continues to be broad-based acceptance from both the scientific community (e.g., US NMFS, US FWS, ORNC) and the ACOE itself, on the potential benefits of policy change and dam breaching (Klatte, 2005; Buck, 2005). As such, its limbo-esque status is more likely a product of much lower consensus and tolerance to change in the political and decisionmaking venue(s).

Examination of the second part of Lowry's (2003) framework offers some support to this possibility.

Physical Complexity of Proposed Changes

Lowry (2003) maintains that the physical complexity of the desired changes, in terms of scale and dimensionality, will significantly impact policy change efforts. Indeed, the logic of this proposition has been demonstrated in the CPR-literature, which generally describes collaborative, stakeholder-driven efforts to manage and protect commonly-used resources (e.g., Ostrom, 1990; 2001), and public policy literature on policy implementation (e.g., Sabatier and Mazmanian, 1980; Pressman and Wildavsky, 1984). Together, these two literatures inform the hypothesis that proposed policy change involving both highly complex undertakings and proposed outcomes is less likely to emerge than in situations where proposed policy changes are low in terms of overall complexity.

In addition, Lubell et., al (2002), identified the potential benefits to both environmental and economic interests as a theoretical advantage offered by the type of successful, common-pool-resource management arrangements and institutions described by Ostrom (1990; 2001). In the Elk Creek case, dam breaching would provide a permanent and reliable means of fish passage for native populations of anadromous fish. In addition to this potential benefit for environmental interests, breaching would represent a proactive investment; the one-time cost of notching therefore becomes slightly cheaper than the cost of building the new trap-and-haul system after just ten years and after fifty years, breaching would result in forty-percent savings (Klatte, 2005). And according to

ACOE studies, the notch-based policy option would not preclude the future completion of the dam in the event of unforeseen circumstances (Klatte, 2005; Buck, 2005

CPR-Literature

According to traditional CPR-based literature (e.g., Hardin, 1968) and more contemporary studies of institutional arrangements (e.g., Ostrom, 1990; 2001), the outcomes of cases involving CPR-management vary according to certain physical characteristics of the undertaking. Generally, win-win cases whereby resource protection and continued resource appropriations are more likely when the boundaries of the resource in question are clearly defined; the distribution of costs and benefits is rather simple and equal; and the individuals immediately affected or involved with proposed changes can genuinely participate. Accordingly to Lowry (2003), this element of complexity is a crucial variable; it is operationalized in two forms – scale and dimensionality.

Scale

Lowy posits that the complexity of a proposed undertaking inevitably increases with additional jurisdictions (e.g., Lee, 1993; Pressman and Wildavsky, 1984). Yet rather than measuring scale in terms of basic spatiality, Lowry (2003) argues that a more accurate way to characterize this measure of complexity is to consider the number and diversity of political jurisdictions involved with a proposed undertaking of policy change. The hypothesis suggests that a greater number of political jurisdictions, and thus increased complexity, will decrease the likelihood of dramatic policy change.

When compared to the cases described by Lowry (2003) as involving the most complex undertakings (e.g., restoration efforts on the Snake and Missouri Rivers), the

level of complexity of the Elk Creek case is much lower. Regarding the former, proposed policy changes involved at least eight different federal agencies, an even higher number of state agencies from many different states – including Iowa, Kansas, Missouri, Nebraska, Montana, Idaho, Oregon and the Dakotas. In addition, the fundamental policy change proposals for restoring the Snake and Missouri included the removal of multiple dams under multiple jurisdictions on major rivers – each having a length in excess of 1,000 miles. On the Missouri, dams proposed for removal were under the jurisdictions of *both* the Corps and Bureau. Additionally, there was (and continues to be) significant disagreement both among and within the federal and state agencies over the proposed changes and a lack of endorsement for dam removal from the two primary jurisdictional contexts involved – the ACOE and BOR.

In comparison, the Elk Creek Dam is wholly under the jurisdiction of the US ACOE, Portland District; other federal agencies include the US FWS, NMFS, NPS, and BLM. In addition to the Oregon Department of Fish and Wildlife, these federal agencies unanimously support dam removal as the cornerstone for the restoration of Elk Creek. And unlike the Snake and Missouri Rivers, Elk Creek flows through only one state (Oregon) and is located less than two miles upstream from the confluence with the Rogue. In fact, the scale of proposed policy change at Elk Creek is much more similar to the cases described by Lowry (2003) in which dramatic policy change (e.g., dam removal) has transpired (e.g., Maine's Kennebec River and North Carolina's Neuse River). The same cannot be said however for Elk Creek in regards to the second measure of complexity discussed by Lowry (2003).

Dimensionality

In a context similar to that of scale, Lowry maintains that a second determining factor of complexity relates to the dimensions involved in a proposed undertaking. Along the lines of Pressman and Wildavsky (1984), Lowry recognizes that increased difficulties are common with the implementation of highly complex, multidimensional programs; inevitably there are more difficulties involved with programs involving a large number of participants, differing perspectives, and a "torturous path of decision points" (Pressman and Wildavsky 1984, 94).

According to Pressman and Wildavsky (1984), difficulties in implementation are partly due to the large number of 'decision points' implementation has to go through and the 'clearances' necessary for its success. According to these authors, a decision point is reached when "an act of agreement has to be registered for the program to continue . . . Each instance in which a separate participant is required to give his consent is called a clearance factor" (xvi).

Based on this understanding, the Elk Creek case offers support for Lowry's (2003) hypothesis that multi-dimensional programmatic undertakings are generally more complex and therefore less likely to produce dramatic policy changes. Cases involving policy change are differentiated by Lowry (2003) according to whether the undertaking is uni-dimensional or multi-dimensional. Based on its jurisdiction, Elk Creek represents a case involving restoration and potential dam breaching in the federal context; this situation is inherently "complex" and "multidimensional". Moreover as a venue, the US Congress is perhaps defined by the greatest degree of "torturous paths of decision points". And when a proposed dam removal would require Congressional action, the

likelihood for such a dramatic policy change may be extremely slim, if not utterly out of the question. Again, the work of Derthick and Quirk (1985) would support this proposition; they identified the necessity for Congressional action as a major constraint on promoting policy change in their study of federal deregulation of the US telecommunications industry. Furthermore, the cases described by Lowry (2003) in which dramatic policy change has been stymied by high dimensionality are similarly situated in the US Congress, arguably the decisionmaking venue with the greatest number of multidimensional decision points

Size, Age, and Complexity

The political receptivity- and physical complexity-based typology developed and used by Lowry (2003) to examine the variation of policy changes involving river restoration was augmented by a brief quantitative analysis to identify various factors that have facilitated previous dam removals. Judging from the strength and confidence levels of these statistical analyses, the most compelling factor associated with dam removal was a structure's inactive status.[9] And while the policy option of dam removal has not emerged in the Elk Creek case, a number of observations can be made. First, Lowry (2003) found that smaller dams were more likely to come down, suggesting that the sheer scope and complexity of the undertaking affects the likelihood of removal. According to the International Commission on Large Dams (ICLD), large dams include those which have "a height of 15 meters from the foundation or, if the height is between 5 to 15 meters, have a reservoir capacity of more than 3 million cubic meters" (ICLD, 2006). Accordingly, Elk Creek Dam – at a current height of slightly more than twenty-five meters – qualifies as a large dam; its current status may thus be a function of its size.

Second, Lowry found that older dams were more likely to be removed. At just under twenty years of age, the current status of the relatively-young Elk Creek may also be a function of its age. In 2005 the average age of the ACOE's other dams was approximately fifty years; in addition the unfinished structure at Elk Creek is comparatively young in regards to other ACOE dams.[10]

Third, Lowry found that inactive dams (versus those actively providing some service(s) at time of their proposed removal) are more likely to come down. The unfinished and inoperative state of the Elk Creek Dam clearly defies this proposition and perhaps its current status is a function of its federal jurisdiction and related requirement that only Congress can order its de-authorization and removal.

In addition, the dam's current status seems to defy an otherwise logical assumption when considering both the low physical scope of complexity of the Corps' restoration plan and the rather straightforward process proposed for its removal. Specifically, when combined with the dam's wholly inoperable status, this comparatively low degree of physical complexity would support the assumption that the structure has already been removed or is slated for removal. Furthermore, there is no reservoir above the dam of any significant size; the need to release huge quantities of both water and stored-sediment is nonexistent. Similarly, large-scale landscape and habitat restoration above the dam is irrelevant. Nonetheless, politics persist and so too does nonfunctioning the Elk Creek Dam.

III. **Dam Removal at Savage Rapids and the US BOR**

Similar to the current conditions at Elk Creek, the Savage Rapids case study meets five of the six general criteria which have prompted previous dam removals

discussed earlier in Chapter 2. First, there is clear evidence that the diversion dam has been the primary cause of accelerated rates of fish mortality for over eighty-five years (e.g., US BOR, 1995; US FWS 1998; Hunter 1998; 2002; 2005; 2005a). In 1995, this was officially recognized by both the Bureau and US FWS; the 1997 ESA-listing of the Rogue River population of Coho salmon firmly established the dam's direct environmental impact(s).

Second, concerns among the region's residents and river users have mounted in regards to social impacts related to salmon decline and/or the possible extinction of native species (e.g., US DC, 2001). Third, economics and cost-benefit analyses identify dam removal as the most viable restoration option; the estimated $21 million cost of retrofitting the dam with modern fish-friendly technologies fails to compare with the estimated, one-time cost of dam removal ($13 million) and subsequent restoration of a $5 million per-year fishery (US BOR, 1995; GPID, 2002). Fourth, the benefits provided by the dam have become increasingly marginal, as urban and suburban growth has decreased the centrality of irrigated agriculture in the region; water delivery to GPID's remaining patrons would continue and actually decrease in cost with the elimination of all lawsuits and claims against the District that would result in a post-dam legal environment (GPID, 2001; Webster, 2005).

And finally, changes in public opinion over the perceived permanence and logic of dams have led many of the region's residents and elected leaders to accept the sheer notion of dam removal (Hunter, 2005; Webster, 2005).[11] In fact, the boards of directors and patrons of the Grants Pass Irrigation District have reversed their previous, longstanding support for the dam on more than one occasion; in December 2002, sixty-

three percent of the District's patrons voted in favor of removal and pump installation (Webster, 2005). In large part, this reversal in opinion stemmed from mounting fear among GPID patrons that without the new system, the added, conditional water right that has allowed the District's continued operation since 1994 would be lost (Hunter, 2005; GPID, 2006).[12] Such a loss would reduce the District's total water allocation by one-third (GPID, 2006). In addition, the financial burden resulting from years of litigation had effectively caused the disintegration of its continued fight to save the dam.

Nevertheless, deeply-rooted opposition persists to both the symbolic meaning of dam removal, in general, and to the prospect of removing an irrigation dam that has defined a region and lifestyle for generations of Oregonians. According to Bob Hunter, an attorney for the conservation group WaterWatch of Oregon and longtime leader in the campaign to remove Savage Rapids Dam, polarization over the issue is more about ideology than science or economics; Hunter maintains the steadfast support to save the dam is rooted in the "Iwo Jima generation who fought the Japs; today they are figting the federal government from taking away their communities' dam" (Hunter, 2005).

BOR and the Savage Rapids Case in Lowry's (2003) Framework

In the Savage Rapids case, the politics of policy change have transpired in a way that suggests both support and uncertainty for the perspective offered by Lowry (2003). Ultimately, fundamental policy change did materialize, yet this policy output of dam emerged from perhaps the least-likely jurisdictional context. As such, the political context of dam removal, as defined and circumscribed by the BOR, warrants additional inquiry.

Political Receptivity to Removing Savage Rapids Dam

During most of this nearly twenty-year controversy, the politics of policy change have transpired in a decisionmaking context largely unreceptive to change and interestingly, at the local and state levels through a sort of *reverse* proxy. At the request of Congress in 1949, the Bureau assumed (by default) its role as the principal federal regulator at Savage Rapids Dam; since then the clear majority of political debate has occurred at the local and state levels. It was not until 2000 that policymakers at the federal level introduced legislation to remove the dam. Prior to this, federal involvement was limited to the following, preparation of an EIS by the Bureau in 1995; listing of the Rogue River population of Coho salmon by NMFS in 1997; and lawsuits filed in 1998 by NMFS in federal court. As discussed in detail in the proceeding section, significant action on behalf of decisionmakers at the federal level did not occur until after the 2001Consent Decree was agreed upon by members of the competing advocacy coalitions, most of whom were active primarily at the local and state levels.

Thus, from mid-1982 to October 2000, most of the political debate and legislative activity related to Savage Rapids Dam was confined to Oregon's 2nd and 4th Congressional districts and to the state capitol in Salem, OR. During this time, interaction between the pro- and anti-dam coalitions was deeply polarized. In large part, this was attributable to the deeply-rooted social, political, and ideological resistance to the concept of dam removal; this resistance is entrenched at the state and local levels in southern and central Oregon (Hunter, 2005a; Webster 2005). Because members in the pro-dam and anti-dam coalitions have been largely unreceptive to change and their debates have unfolded in state and local decisionmaking venues that have exhibited an

intolerance to change, the fact that fundamental policy change has only recently materialized supports the general observations of Lowry (2003). Table 7.3 provides a summary list of the major players in each of the competing coalitions.

Table 7.3 – Competing Advocacy Coalitions at Savage Rapids (1987 – 2006)

Pro-Dam • Keep dam; secure funding for rehabilitation and updated fish passage.	**Anti-Dam** • Remove dam; secure funding for river restoration and new pump installation.
GPID Board of Directors (1916-1996; 1997-2000)	US FWS
Dennis Beckland (Chairman, GPID Board, 1997-2000)	US NMFS
Don Greenwood (Chairman GPID Board, 2000-2002)	State of Oregon Water Resources Department
State Senator Brady Adams (OR)	State of Oregon Water Resources Commission
Many longtime area residents	State of Oregon Watershed Enhancement Board
	John Kitzhaber (former OR Governor)
	US Representative Greg Walden (R-OR 2nd)
	US Senator Ron Wyden (OR-D)
	US Representative Bob Smith (R-OR)
	Tom McMurry (Chairman, GPID Board of Directors, 1995-1997)
	Judy Gove (GPID Board of Directors and founder of CRI)
	Martha Pagel (former Director of the Oregon Water Resources Department)
	Michael Jewett (former member of the Oregon Water Resources Commission; former City Attorney for the City of Medford, OR)
	WaterWatch
	American Rivers
	Robert Hunter (attorney, WaterWatch of Oregon
	Citizens for Responsible Irrigation (CRI)
	US BOR[13]

Coalition Interactions, Decisionmaking Venue, and Tolerance for Change

"This has become so polarized between the dam-huggers and the fish-huggers, that nobody is willing to give anything." – Former GPID Board Chairman Tom McMurray.[14]

At the local level, the controversy over Savage Rapids Dam began in earnest when GPID applied for an additional (90 cfs) water right in 1987. Support for a competing advocacy coalition was galvanized soon after through the initial efforts of

WaterWatch, Rogue Flyfishers, and the American Fisheries Society (Hunter, 2005a). For its part, GPID failed to exercise due diligence in planning for fish passage alternatives – including dam removal as stipulated in its 1990 agreement with WaterWatch and Oregon's Water Resources Commission (OWRC) (Hunter, 2005). When the Bureau's EIS recommended dam removal and installation of pumps as the cheapest and most beneficial alternative for solving fish passage problems at the dam, GPID dug in and quickly elected a new, pro-dam board of directors. Within days, this new GPID board voted to renege on its previous commitment to remove the dam. In addition, the District's new board began to lobby state legislators to keep the dam.

In large part, the deeply-rooted resistance to the prospect of removing Savage Rapids Dam made it possible for GPID to wage an expensive legal and political battle in the state legislature to save the dam. In 1995, state Senator Brady Adams – a longtime resident of Grants Pass, OR became president of the Oregon Senate and made preserving the status quo (i.e., saving the dam) a top priority. His efforts were successful and in the same year, the Oregon legislature passed a bill to save the dam; much to the chagrin of GPID and its supporters in the state legislature, then-Governor John Kitzhaber vetoed the pro-dam bill. Still undeterred, the legislature was successful in further delaying dam removal when it passed a bill that created a task force to further study the planned restoration of the Rogue. And despite its report issued a year later, which highlighted the environmental damage caused by the dam, the task force had been heavily stacked with save-the-dam advocates and a majority of its members voted for a fish passage policy alternative that would leave the dam in place (Hunter, 2005a).

A year later in 1997, the Oregon legislature had still not taken action on this policy alternative issued by the task force; by default this caused the prior (1994) OWRC order requiring dam removal as a condition of GPID's water right to take effect (Hunter 2005a). That same year, the Rogue River population of Coho salmon was listed as threatened under the ESA. According to Nijhuis (1998), the listing compelled then-GPID board chairman Tom McMurry to shift positions and endorse the dam removal proposal.

Committed to its continued fight to save the dam, GPID voted to recall chairman McMurry that same year. The vacancy was soon filled by Dennis Becklin, a local figure characterized by many as the most aggressive dam advocate to ever head GPID (e.g., Hunter, 2005; 1998; WaterWatch, 2002). Nonetheless, Becklin was voted off GPID's board in 1999 and is now the chief editor for the website Klamath Basin Crisis, which represents the concerns of Klamath Basin communities, irrigators, farmers, ranchers, miners, loggers and fishermen (KBC, 2006). In a May 2005 editorial titled, "$30-Million & Counting the Stupidity – Removing Oregon's Savage Rapids Dam – An Enviro's Wet Dream", Becklin asserted the following; this suggests that not all actors have policy "learned" as the ACF suggests.

"With BoR's foreknowledge that this dam does not kill the very salmon and steelhead its removal is supposedly going to protect, this dam removal project is a testimonial to the corruption of environmentalism. This dam removal project is also a testimonial to the infinite stupidity of US Government involvement in this project and to the environmental complicity of the media in spreading false information about the dam".[15]

Decisionmaking Venue and Tolerance for Change

The Savage Rapids case is unique (even more so than Elk Creek) in that there are a number of decisionmaking venues – and by extension – decision points that exist across jurisdictional and governmental contexts. The level of tolerance for policy change in

each of these has varied both internally and externally during the course of this quarter-century debate. This diverse array of decisionmaking venues and large number of jurisdictions is discussed in detail later in this Chapter regarding the scale- and dimension-based components of Lowry's (2003) theoretical framework.

At the local level, debate has been rooted in the GPID; its five-person board of directors is elected every two years from among its roughly 8,000 patrons. Since at least 1990, GPID's directors and patrons have been divided on the issue of dam removal; and as early as 1994, it had voted to remove the dam. Yet the District's pattern of 'flip-flopping' its stance on removal (e.g., 1994, 1995, 1997, 2000, 2001) combined with sustained opposition to removal from state politicians has worked to stymie virtually any significant policy change from transpiring for nearly twenty-five years. Further, GPID had been warned by state and federal officials since at least 1988 that the dam most likely represents the largest single source of fish mortality on the Rogue and that passage for both juvenile and adult salmon will inevitably be required. Nonetheless, it took eighteen years until a settlement was reached on federal and state litigation; the August 2001 federal court Consent Decree required GPID to work for federal legislation to remove the dam and replace it with pumps by no later than the end of 2005. When that date was reached, GPID was granted a one-year extension.

Also at the local level, many area residents had witnessed and been impacted by the earlier controversy over logging and the endangered spotted owl; this experience served to further ingrain a basic distrust of government and the conservation/environmental community among many long-time area residents (Hunter, 2005; 2005a). According to a published editorial written by one GPID board member,

"I resent giving up our rights to Washington – and eventually to the United Nations... If this GPID board is forced to give up the fight, either locally or by Washington, we'll soon see that Savage Rapids Dam was just a test case of federal takeovers" (Hunter, 2005a, 1).[16]

By some accounts (e.g., Hunter 2005; 2005a), dam removal opponents such as Dennis Becklin were successful in exploiting such a fear; dam removal opponents were able to wage an antagonistic misinformation campaign, claiming among other things, that the dam did not harm fish (and even if it did, native populations were not in danger); fish hatcheries could mitigate any damages; the proposed irrigation pumps would fail to deliver water; WPID lands would dry up; property values would plummet; and that a million cubic yards of contaminated sediment was stored behind the dam and any sediment released would have catastrophic consequences. In the end, the result was a deeply polarized social and political climate at the state and local levels (Hunter, 2005a).

At the state level, GPID has received sustained support from the Oregon legislature; beginning in 1995, repeated attempts were made to pass legislation to save the dam (Hunter, 2005a). In addition, legislators led by former Senate President Brady Adams (a Rogue River area resident himself) were successful in delaying dam removal for years via creation of a special task force and mandatory studies in 1995.

Beginning in 1998, Oregon's courts were brought in the mix; that year the OWRC filed suit to have GPID's water right cancelled for violating the 1994 permit condition that it pursue dam removal with "due diligence" (Hunter, 2005a). A hearings officer found that GPID had failed to exercise due diligence and subsequently, the State Water Resources Commission issued an order canceling the District's water right. This was appealed and the cancellation order was stayed pending the appeal. The same year, US NMFS filed suit in federal court, seeking to block water diversions at the dam until

juvenile Coho salmon completed their downstream migration past the dam. In support, a group of twelve conservation organizations intervened in the litigation, as well as two other groups associated with the sport fishing industry (Hunter, 1998).

Settlement negotiations via federal court mediation continued throughout 1999 on both the state and federal cases. And in 2000, negotiations over federal legislation to remove the dam commenced. The same year, the Oregon Court of Appeals dismissed GPID's 1998 appeal of water right for its role in improperly delaying the dam removal process. Unsurprisingly, GPID appealed this case to the Oregon Supreme Court immediately thereafter (Hunter, 2005; 2005a). By one account, between 1996 and 2000 GPID incurred an estimated $750,000 in legal fees associated with its campaign to save Savage Rapids Dam (Ehrhardt, 2001). Ultimately, legal fees of this magnitude caused the remaining pro-dam GPID patrons to reverse their support and elect a board of directors comprised entirely of dam removal proponents (Hunter, 2005; 2005a).

Before GPID's 2000 appeal was resolved, policy development emerged at the federal level that would, after nearly twenty-five years of debate, clear a path through which for substantial policy change could progress. In October 2000, Oregon Senator Ron Wyden introduced federal legislation (S. 3227) to authorize federal funding to remove Savage Rapids Dam (and replace it with pumps). Despite having bipartisan support from Oregon's congressional delegation (e.g., Senator Gordon Smith (R) and Representatives Greg Walden (R) – OR 2nd and Peter DeFazio (D) – OR 4th, no action was taken prior to the cessation of the 2000 session. Nonetheless, as discussed in Chapter 5, this represented a significant development in the proposed restoration of the

Rogue River; it would provide a framework for future agreements since it set forth the elements for a funding package that the nonfederal parties agreed to support.

In 2001, the Consent Decree was signed, in which all parties agreed to continue working together to fund and implement the pumping/dam removal plan outlined in the 2000 Savage Rapids Dam Act. According to Senator Gordon Smith, this was an absolutely critical development in the progression of policy change that ultimately culminated with passage of the 2003 Savage Rapids Dam Act (Duewel, 2001). Specifically, Senator Gordon commented the following.

"What's almost impossible to do is take a controversial local issue and ask Congress to resolve it with lots of money. So if local people can resolve their differences, I can get it done... It's hard to make law, and the more controversy, the less likely it is to happen ... The more the parties come together, the more likely they are to succeed, in court and in Congress".[17]

The Savage Rapids Dam Act was subsequently approved by Congress in December 2003. Interestingly, the bill was introduced under a slightly different name; the words "dam removal" were removed from the title, which GPID board members perceived to focus more on the positive (Duewel, 2002). In addition, the bill included no mention of electricity to operate the pumps; the 2000 bill had earmarked $3.7 for the power needed to fuel the new pumps. This change was deemed necessary, since opponents of dam removal had listed electricity costs as a major concern (Duewel, 2002).

Additional Factors and Political Receptivity to Change

Similar to the Elk Creek case, the costs of maintaining the status quo have been high in the Savage Rapids case, albeit not as high or obvious. Perhaps most fundamentally, this is because the former case involves an unfinished, useless, and costly dam whereas the latter involves a dam that has provided a tangible benefit to society in

the form of diverted irrigation water to the nearly 8,000 patrons of the GPID. In addition, the annual costs of maintaining the structures and improving fish recovery programs are made more difficult to justify for dam supporters at Elk Creek than at Savage Rapids, where a portion of the costs are borne by the irrigation district and supporters can point to revenues associated with the region's agricultural production that is made possible by the irrigation water diverted at Savage Rapids.

Furthermore, homeowners along the seasonal reservoir created by Savage Rapids Dam argue that dam removal would adversely affect their property values. In a similar vein, many downstream riverfront property owners argue that current conditions enhance their property values because the dam blocks excessive boat traffic past their homes; policy change involving dam removal would open this stretch of the Rogue and thereby increase recreational opportunities for boating and fishing for members of the general public. Simply put, this would allow greater access to the river; from the homeowners' perspective this would create excess "traffic" and "disturbance" on what is technically a public resource (Hunter, 2005; 2005a).

In terms of the final condition Lowry (2003) associated with enhanced political receptivity to change, there is an element of disagreement on the potential benefits of policy change involving dam removal on the Rogue. Specifically, there is some concern among irrigators that the pumping system proposed to replace the dam's water-diversion function may fail. In 1996, while serving as chairman of the Savage Rapids Dam Task Force, Dennis Beckland cultivated this argument by suggesting the Bureau's planned placement of pumps would cause them to be rendered useless by silt accumulation in the undammed river (KBW, 2005). After the Bureau decided to locate all of the pumps on

the river's south side; Beckland then argued that sediment released by the dam would deleteriously affect the water intake and supply system used by the city of Grants Pass, OR. In addition, Beckland continues to argue against removing Savage Rapids Dam on aesthetic grounds; the BOR plan proposes to leave a large section of the (ugly) dam in place and the large pipeline proposed to carry diverted water to canals on river's north side will allegedly further compromise the area's scenery (KBC, 2005). Notwithstanding these alleged detriments, both the Bureau and the engineering firm contracted to remove the dam have expressed no subsequent concern.

Beyond the aforementioned operational and aesthetic concerns regarding dam removal and pump installation, there is near-unanimous consensus regarding current environmental conditions, specifically in regards to the federally-listed Coho salmon. Dam removal has been identified as the best and most viable solution for solving fish passage problems by several government agencies, including the US FWS; US NMFS; US BOR; and the Oregon Department of Fish and Wildlife. As such, there is rather broad-based consensus in the scientific community concerning the imperiled fate of Coho on the Rogue – which were listed alongside the Elk Creek population in 1997. As it stands today, the Savage Rapids Dam impedes the upstream and downstream passage of five runs of salmon and steelhead, including the threatened Coho salmon. In its 1995 EIS, BOR estimated that dam removal would on average increase salmon and steelhead productivity in the Rogue Basin by approximately 144,000 fish each year, valued at more than $5 million annually (GPID, 2002).

CPR-Literature and Physical Complexity of Proposed Changes

As discussed previously, the CPR literature suggests that individuals will mobilize and change their behavior to promote resource protection when the boundaries of the resource in question are clear, and in situations where the individuals directly tied to the resource and thus affected by proposed changes can genuinely participate in the forging of agreements and creation of management institutions (e.g., Ostrom, 1992; 2005). Both of these conditions apply to the progression of policy change in the Savage Rapids case. First, the section of Rogue River targeted for dam removal and restoration is clearly defined and roughly 141 miles in length. Second, those patrons directly affected by the proposed restoration have been able to participate through the GPID. And area residents who do not receive water from GPID have been represented by proxy in the Oregon legislature and more recently, the US Congress.

As was discussed in Chapter 3, the CPR literature is used by Lowry (2003) to capture the physical characteristics of the resource itself and describe related elements of physical complexity regarding attempted policy changes. The CPR literature was extended by Lowry beyond its institutional and resource management focus to examine policy change from a more traditional, political science-based perspective. Two distinct categories of variables are used by Lowry (2003). The first relates to scale, which is measured in terms of the number of political jurisdictions involved and the number likely to be affected by proposed changes. The second category relates to dimensionality; this includes the difficulties associated with undertakings involving more participants, differing perspectives, and a "torturous path of decision points" (Pressman and Wildasky 1984).

Scale

The large number of decisionmaking venues – and by extension – decision points that exist across jurisdictional and governmental contexts that were discussed previously in this Chapter clearly relate to this first measure of physical complexity. The dam was built with private funds and for its first twenty-eight years of existence, was wholly owned and managed by GPID. This began to change when Congress first requested that BOR assume responsibility for administering maintenance and repair projects in 1949. For its remaining fifty-eight years (assuming it is removed as planned by 2007), additional facets of its administration would be assumed by the Bureau. Today, Savage Rapids Dam is even featured alongside other BOR projects on the agency's website.[18] The onset of the mainstream environmental movement in the mid-to-late-1960s created opportunities for additional federal (and state) regulation (e.g., on behalf of US FWS, US NMFS, and ODFW).

Nonetheless, the legitimate local and state jurisdictional claims remain and together serve as an additional component, augmenting the categories of scale and dimensionality. By extension, the end result of this case's multi-scale combination of GPID boards of directors and patrons, the Oregon legislature, and the US Congress – each with some legitimate claim on political jurisdiction – and multidimensional assortment of participants – with often-differing positions – is an extraordinary level of complexity. Yet, dramatic policy change has emerged in the Savage Rapids Dam case; albeit slowly and at times distressing to various members in the competing coalitions.

Furthermore, the 141-mile stretch of the Rogue River that will be impacted by the dramatic policy change involving dam removal flows through a dizzying array of

political jurisdictions. These include the Siskiyou National Forest, BLM-administered lands, officially-designated Wilderness Areas located on lands administered by both the USFS and US BLM (e.g., the Wild Rogue Wilderness Area), and coastal areas included in the Oregon Islands National Wildlife Refuge, part of the Oregon Islands Wilderness Area, and state-owned lands. The addition of the federally-listed Coho salmon in this portion of the Rogue River, and the concomitant jurisdictional involvement of the US FWS and US NMFS, further adds to the complexity of this multidimensional case.

Size, Age, and Complexity

Regarding the additional factors identified by Lowry (2003) that have facilitated previous dam removals, a number of observations emerge from the Savage Rapids case; these offer both support to and partially defy the hypotheses identified in the previous work. First, Lowry (2003) found that smaller dams were more likely to come down, suggesting that the physical scope and complexity of the undertaking affects the likelihood of removal. The Savage Rapids Diversion Dam stands 39-feet-tall and spans the Rogue River a length of some-456-feet; the canal system is roughly 67-miles in total length (with an additional 40-miles in lateral canals) and is fed by a single, main pumping plant and five additional "relift" pumping plants.

Based on the twofold classification scheme developed by the ICLD, the Savage Rapids Dam (at just under 12 meters), which creates a seasonal reservoir of approximately .91 million cubic feet (or 25,768.33 cubic meters), falls short of qualifying for a large dam (e.g., its height is between 5 and 15 meters but reservoir capacity is < 3 million cubic meters). Nonetheless, ICLD suggests the placement of such a dam (e.g., a structure of notable size – between 10 – 15 meters high – and comparatively small

reservoir) in the 'large dam' category. Specifically, ICLD suggest this categorization for dams that are between 10 and 15 meters in height, when so-called "special design complexities" are present. These involve location on major rivers and connections with extensive water-related infrastructure (ICLD, 2006). Because of its location on the Rogue River and extensive pumping- and canal-based water delivery system, the Savage Rapids Dam satisfies these additional criteria. Thus, as a structure meeting the ICLD's requirement for large dams, the recent decision and progress related to dam removal do not offer support to Lowry's hypothesis regarding size and type of policy change (2003).

Second, Lowry found that older dams were more likely to be removed. At more than 85-years old, the recently acquired (slated-for-removal) status of the Savage Rapids Dam is likely a function of age.

Third, Lowry found that inactive dams (versus those actively providing some service(s) at time of their proposed removal) are more likely to come down. Despite its advanced age and lack of modern fish-passage-technology, the Savage Rapids Dam delivers a tangible benefit to society in the form of diverted irrigation water to the nearly 8,000 patrons of the GPID.

Furthermore, in terms of sheer physical complexity, removal of the Savage Rapids Dam will not require extensive habitat restoration and more importantly, sediment removal and transport. In response to the suggestions of some in the pro-dam coalition, the Bureau performed additional, more thorough studies in August 2003 and found that less sediment was stored than previously believed; the total volume of reservoir sediment was approximated at a comparatively-small 200,000 cubic yards, or a volume that is roughly equivalent to a two-year sediment supply from the Rogue River (US EPA, 2005).

In addition, chemical testing of the reservoir sediments in August 2003 did not find any contaminants in concentrations significantly greater than natural background levels. As such, these sediments will not pose any hazard to water quality, fish and wildlife, or human uses when released downstream of the dam as it is removed. Again, opponents of dam removal had previously raised concerns of sediment contamination and potential adverse impacts if released. This approach eliminated early on one of the biggest objections to dam removal (Heinz Center, 2002).

After twenty-plus years of policy advancements and retractions, dam removal as an output of policy change now appears inevitable at Savage Rapids on Oregon's Rogue River. To evidence this, the Slayden Construction Group Inc, a Salem, OR-based construction firm, received the first installment of its $28 million federal contract from BOR to remove Savage Rapids Dam in Mid-August 2006. The federal contractor is positioned to remove the dam by late 2009, thus restoring this 100-mile-plus section of the Rogue River to salmon (IRN, 2006b).

III. Nonfederal Dams and FERC Regulation

Through its regulation of the nonfederal hydropower industry, the primary goal of FERC has been to promote and authorize the development of hydroelectric dams as a means to harness a river's power generation capabilities (HRC, 2001). And while FERC may regulate hydro-dams owned by state or sub-state government entities, it primarily regulates facilities owned and operated by private interests. And similar to the federally owned and operated context, development of this renewable energy source (e.g., hydropower) via FERC-regulated dam operations has oftentimes proceeded in unawareness or disregard of subsequent ecological impacts. Also, in a manner related to

federal agencies such as the Corps and BOR, FERC has undeniably been impacted by society's emergent environmental conscience and a host of newfound environmental mandates subsequent to the mainstream environmental movement.

FERC: From Dam Limbo to Dam Removal at Milltown

Similar to the Elk Creek and Savage Rapids case studies, the Milltown Dam case meets five general criteria, discussed earlier in Chapter 2, which have prompted previous dam removals. These include concerns related to environmental impacts (e.g., the federally-listed status of the Bull trout); social impacts, including access to safe drinking water; economics and cost-benefit analyses; marginal benefits from continued operations; and changes in public opinion over the perceived permanence of dams. Yet unlike the previous two cases, and perhaps most significantly, dam removal in the Milltown case has been (and continues to be) driven largely by safety concerns and the real threat posed to public and environmental health by this aging structure. Quite simply, the potential costs in terms of public health and ecological destruction (and economic loss) that would result from even a partial release of the highly-contaminated sediments held in place by Milltown Dam were (and continue to be) readily apparent and potentially catastrophic. Such a public health concern associated with exposure to the highly- carcinogenic arsenic is likely the leading criteria which ultimately prompted this particular example of dam removal – as an output of policy change – to emerge.

In addition, the presence of a potential toxic time-bomb, held down only by an aging and structurally-flawed dam is, after all, difficult for public officials and community leaders to ignore. The dam had in fact experienced extensive damage due to deteriorated timbers and excessive leakage through its structure on at least three

occasions since 1973. However, what wholly separates this case from that of the dam politics at Elk Creek (and to a lesser degree at Savage Rapids) is perhaps the most fundamental difference; Milltown's situation in the FERC jurisdiction meant that the ultimate decision to remove did not require Congressional action. Rather, the final decision was the cumulative result of a governor's statement; EPA's selection of a preferred alternative; overwhelming scientific consensus; and a less-than-assertive FERC-stance on relicensing.

FERC and the Milltown Case in Lowry's (2003) Framework

Similar to the previous case studies, proposed river restoration at the Milltown site has involved a host of issues, which together, offer mixed support for Lowry's (2003) theoretical framework for anticipating various types of policy change. Examination of additional cases from across jurisdictional contexts in future research will shed light on possible patterns in these political dynamics.

Political Receptivity to Removing Milltown Dam

The debate to remove Milltown Dam was situated in a decisionmaking context that was somewhat receptive to policy change, especially at the local level. A host of officials from the Missoula City – County Health Department (MCHD) and a series of county commissioners and other state and local politicians have long-since endorsed the proposal to remove the dam. In fact, according to both Stone-Manning (2005) and Nielsen (2005), what ultimately proved crucial for their success was the manner in which pro-change interests, led by the CFC, worked collaboratively to bring down the dam with the (Republican) party in power at the state level. Also, Stone-Manning identified how the CFC's intentional effort to genuinely include the people and community of the

Missoula area was instrumental for ultimate success. Accordingly she stated, "We [the CFC] transformed an environmental issue into a broader community issue" (2005). Table 7.4 provides a summary of the major players in each of the competing coalitions.

Table 7.4 – Competing Advocacy Coalitions at the Milltown Site (1983 – 2006)

Pro-Dam • Retain the dam; avoid financial liability; seek permanent plan to "cap" the contaminated sediments on-site.	**Anti-Dam** • Remove the dam; secure funding for fundamental or "on-site" cleanup, whereby the entire dam and most contaminated sediments would be removed.
Bonner Development Group	Clark Fork Coalition
Bruce Hall, founding member, Bonner Development Group	Tracy Stone-Manning, executive director, Clark Fork Coalition
Atlantic-Richfield Company	Friends of Two Rivers
Montana Power Company	Gary and Judy Matson, founders and current board members, Friends of Two Rivers.
NorthWestern Energy	Missoula City-County Health Department
FERC	Peter Nielsen, environmental health specialist, Missoula City -- County Health Department
	State of Montana
	Montana Department of Environmental Quality
	US FWS
	US EPA
	Missoula City Council and County Commission (2001)
	Michael Kennedy and Barb Evans (Missoula County Commissioners)
	US Senator Max Backus (D-MT)
	State Senator Dale Mahlum (R-MT 35th)
	State Representative Dick Hanes (R-MT 63rd)
	(former) Governor Judy Martz (R-MT)

Coalition Interactions

The interactions and working relationships between the anti-dam coalition, led by the Clark Fork Coalition (CFC) and the pro-dam coalition, led by the Bonner Development Group (BDG) were identified by Stone-Manning as having been mostly friendly, cordial, and without personal attacks (2005). Further, it was said that each side seemed to recognize the others' position and constituency; in essence, the competing coalitions agreed to disagree (Stone-Manning, 2005; Matson, 2005). To some degree,

this may be attributable to the fact that many of the public hearings and meetings were local, and the two sides had regular contact and even joked with each other on occasion (Stone-Manning, 2005). Together, the presence of local, bipartisan cooperation and prevalence of community-based public hearings created a decisionmaking venue that was at least fairly receptive and thus able to produce dramatic policy change; a phenomenon that would generally support the conclusions of Lowry (2003).

Nevertheless, there is strong evidence to suggest that fairly low levels of receptivity to change existed on behalf of the primary non-local player. Regarding FERC, the CFC described their interactions with the Commission's federal personnel as something akin to "dealing with wizards from behind the curtain" (Stone-Manning, 2005). Specifically, members of the CFC could not recall ever having actually seen or spoken in-person with any FERC representative. Also, there is clear evidence that FERC balked for years at EPA's requests that it officially weigh-in on the relicensing issue; FERC waited until after EPA's statement to issue its official position (e.g., to accept a license surrender and turn the dam over for removal). In addition, FERC's early attempts to cover-up safety concerns about the dam suggest that at least initially, it was not wholly receptive to change (Nielsen, 2005).

In stark contrast to these relations with FERC, CFC staffers described their working relationship with representatives from the US EPA as "very friendly and personal" (Stone-Manning, 2005). Such a mixed pattern within a given decisionmaking venue, where working relationships ranged from productive and cordial to impersonal and essentially nonexistent, makes it difficult to draw definitive conclusions. Perhaps additional in-depth studies of river restoration and dam removal in the FERC

administrative context will help resolve this uncertainty. Notwithstanding, an immediate consideration of the additional factors identified by Lowry (2003) as enhancing the receptivity of coalition interactions toward change provides additional insight.

Readily Apparent Costs of the Status Quo

Lowry (2003) suggests that receptivity to proposals for change increases if the costs of maintaining the status quo are comparatively high and more apparent. In the twenty-odd years since the Milltown site was listed under Superfund, there was ample opportunity for coalitions on both sides to realize the situation's gravity and potential for enormous catastrophe. The potential costs, in terms of economic loss, public health, and ecological destruction, that would result from even a partial release of the highly contaminated sediments were (and continue to be) readily apparent. In addition, real evidence of these costs had been previously experienced by community members; the identification of arsenic in local wells and the dramatic fish kill caused by the 1996 ice floe both received direct and detailed local attention. The imminent threat of future costs associated with capping the sediments behind the dam helps explain the fairly high degree of local, bipartisan consensus.

Scientific Consensus on Benefits of Proposed Change

Lowry (2003) posits that the proponents of policy change must convincingly advance the future benefits of change to a widespread audience. In particular, he cites the important role of science-based information that is consistent and reliable. In the Milltown case, the accumulation of such science-based information began when the dam and surrounding area were proposed as one of the nation's first Superfund sites in 1982; the site was formally listed in September 1983. Soon thereafter, the site ascended on the

US Environmental Protection Agency's (EPA) National Priority List.[19] To date, this 120-mile stretch of the Clark Fork River remains the nation's largest Superfund site; Milltown Dam represents its terminus.

An additional source of reliable, science-based information advanced by proponents of change came from the 1998 listing of the Bull Trout as threatened by the US FWS. Since then, conservation organizations such as Trout Unlimited and American Rivers have drawn future attention to this aquatic species and its uncertain future on Montana's Clark Fork River.

Regarding concerns over public health, the accumulation of science-based evidence of water pollution began in 1981 when arsenic was found in drinking water wells in and around the Milltown area (Nielsen, 2005). Later, in 1993, EPA completed a series of risk assessments associated with the Milltown site and identified groundwater contamination as the site's "principal problem to baseline human health to be remedied (US EPA, 2003). Since then, potential for public exposure to this highly-carcinogenic substance – and the additional risks associated with exposure to the copper, lead, zinc, and cadmium in Milltown's sediments – have drawn sustained and widespread public attention.

Physical Complexity of Proposed Changes

As previously discussed in Chapter 3 and earlier in this Chapter, Lowry (2003) identifies the physical complexity of proposed changes, in terms of scale and dimensionality, as significant in determining the success or failure of policy change efforts. Such logic has been widely demonstrated in both the CPR-literature, which generally describes collaborative, stakeholder-driven efforts to manage and protect

commonly-used resources (e.g., Ostrom, 1990; 2001), and public policy literature on policy implementation (e.g., Sabatier and Mazmanian, 1980; Pressman and Wildavsky, 1984).

Also discussed previously, Lubell et., al (2002) identified the potential benefits to both environmental and economic interests as an inherent theoretical advantage offered by the type of successful, CPR-management arrangements and institutions described by Ostrom (1990; 2001). In the Milltown case, dam removal not only provides a permanent and reliable means of fish recovery for the threatened Bull Trout, it also represents a component of the larger restoration plan to provide access to and remove the estimated 2.6 million cubic yards of contaminated sediments (US EPA, 2003). In addition to these benefit for environmental and public health and safety interests, the entire restoration project represents an economic driver to the region, providing an estimated $120 million in related jobs (Stone-Manning, 2005). Consider the following comment by US Senator Max Baucus (D-MT).

"We've got it [federal funds for Milltown restoration] in there. And since I'm writing the bill, the Milltown dollars will stay in there. Redeveloping the Milltown area is a top priority because we can turn a sow's ear into a silk purse, create jobs and develop a real asset for the area".[20]

Scale and Dimensionality

Lowry (2003) conceives of these related concepts in terms of the number of decisionmaking points involved with proposed policy changes and by extension, the number of jurisdictions potentially affected. As previously stated, the hypothesis posits cases with a greater number and type of decision points and political jurisdictions as more complex and thereby less likely to produce policy change than cases with fewer of these elements involved. And while the predominant jurisdictional context of Milltown Dam

did not require Congressional action to elicit fundamental change – thereby omitting the institutional impediments identified by Derthick and Quirk (1980) – the case as a whole seems to embody Lowry's (2003) understanding of large scale and high dimensionality. Consider the following.

The near-century-old dam had fundamental structural deficiencies and its continued operation required a FERC relicense order. The initial application process is what triggered CFC's revival of the movement to remove Milltown Dam. Milltown Reservoir also had the dubious distinction of being the terminus for the nation's largest Superfund site; the aging dam was solely responsible for constraining a century's worth of highly contaminated sediments. In addition, the dam served to adversely affect a federally-listed species and had been found to constitute a "taking" of the Bull trout under the ESA. Taken together, these factors necessarily involve a dizzying number of jurisdictions and the multiple decision points; this seems to resemble the exact notion of a "torturous path" as identified by Pressman and Wildavsky (1980). Nevertheless, fundamental policy change did (eventually) transpire.

The output of this policy change is represented by the Consent Decree to remove Milltown Dam, which was signed on Aug. 2, 2005. After twenty-two-years of investigating the site, debating a cleanup plan, and negotiating who would pay for what, the CFC-led anti-dam coalition succeeded in its efforts to elicit fundamental policy change. The resulting 184-page Decree required official approval from no less than four federal and state agencies (e.g., US Department of Justice (US DOJ), Environment and Natural Resources Division; US Environmental Protection Agency (US EPA); US Department of the Interior, US Fish and Wildlife Service (USFWS); and Montana

Department of Environmental Quality (MDEQ); two tribal governments (e.g., the Confederated Salish and Kootenai Tribes), and the Atlantic Richfield (ARCO) and Northwest Energy Companies. In addition to these eight officially-designated "settling defendants", the Decree was required an additional thirteen signatories from secondary units of the US DOJ, US EPA, MDEQ, the two tribes; and ARCO .[21]

In addition to the large number of political and administrative contexts involved in the Milltown case, the planned restoration also involves an array of restoration activities. In all, these are projected to costs roughly $120 million. ARCO will bear the majority of costs for the $100 million construction project (e.g., removal of the Milltown Dam and related structures, including the powerhouse, shop, dividing block, spillway, radial gate, forebay and portions of the right abutment concrete gravity wall) (US EPA, 2005). NorthWestern will contribute $11.4 million to remove the site's hydroelectric components, including transmission towers and electrical infrastructure, prior to the actual dam removal. For its part, FERC granted a license surrender order to NWC; it took effect the day the Consent Decree was signed. The settlement also requires that both ARCO and NWC provide funds for historic preservation; Bull trout recovery; removal of the nearby Stimson Dam; mitigation for a State-owned bridge and highway; reimbursement for past and future federal response; and oversight costs related to the Milltown project (US EPA, 2005). In addition, the State will have the option to acquire approximately 500 acres of land and the water rights at the Milltown site, currently owned by NorthWestern.

The restoration project began in earnest with the removal of the Stimson Dam (30-feet-in-height) in September 2005. This rock and crib dam located in the Blackfoot

River was not part of the Superfund remedy; it was removed through a cooperative effort of the National Fish Passage Program of the US FWS (US EPA, 2005). With this removal, the threatened Bull trout has gained access to additional habit above Milltown Dam. ARCO contributed $230,000 and Northwestern added $80,000 for this auxiliary project.

The first stage of the Milltown site restoration began in June 2006 and is scheduled to last through October 2007. During this time, the Milltown Reservoir will be drawn-down by approximately ten feet and the bypass channel and rail spur will be installed; the rail spur is intended to facilitate sediment transport to an upriver storage site. Also planned for October 2007 is the drawdown of Milltown reservoir by an additional seven feet. Prior to this however, the Clark Fork River will be directed into the bypass channel in order to limit erosion of contaminated sediments downstream. The final reservoir drawdown is planned for early-2008, when the dam's spillway will be removed. Sometime thereafter, the remaining structures will be removed and the roughly-two-year process of sediment removal and transport will follow (US EPA, 2005).

Size, Age, and Complexity

Regarding the supplemental quantitative analysis offered by Lowry (2003) to identify various factors that have facilitated policy change involving dam removal in the past, a number of peculiarities emerge from the Milltown case. First, Lowry (2003) found that smaller dams were more likely to come down. Milltown has a current height of roughly eighteen meters, and thus qualifies as a large dam according to ICLD standards. Its removal thus contradicts the simple proposition made previously concerning size and likelihood of removal. In addition, the age and type of composite

(timber/concrete) construction of the dam are not prototypical of most modern large dams. In this sense, the dam's advanced age and deteriorating structure may effectively compound the factor of size and thus explain the output of dramatic policy change in this case. Moreover, the ICLD treats dams that are between 10 and 15 meters in height are treated as large dams if they present special design complexities, such as retention of toxic materials. With consideration of this additional criterion developed by ICLD, Milltown Dam would qualify as "doubly large" – if such a category existed.

Second, Lowry (2003) found that inactive dams (versus those actively providing some service(s) at time of their proposed removal) are more likely to come down. The deteriorated state of the Milltown Dam and its minimal production of hydroelectricity clearly support this proposition. However, an alternative perspective on Milltown Dam could suggest that when and if left in place, it indeed provides a highly critical function – the storage of 6.6 million cubic yards of contaminated reservoir sediment. Indeed, this was the primary assertion made the pro-dam coalition during its efforts to retain the dam; albeit in some augmented and strengthened form. By holding-back the reservoir and thus preventing the release of its toxic sediments, one could assert that as it existed prior to June 2005, Milltown Dam and Reservoir were eminently active in providing a service at the time of their proposed removal.

This brings back the issue of the contaminated sediments held in place by the dam and reservoir it created. In terms of the sheer physical size and complexity of the proposed restoration at the Milltown site, the excavation of contaminated sediments that will follow the reservoir's draw down and dam's removal will involve an unprecedented scale. Specifically, the restoration plan calls for rail transportation of roughly one-third,

or 2.1 million cubic yards, of the most contaminated sediments to Opportunity Ponds, an existing waste repository at the Anaconda Smelter Superfund Site.

Not only does this 100-mile distance between Milltown and the final repository site represent a logistical challenge, the residents of nearby Opportunity, MT have mobilized against transport of the toxic sediments to their neighborhood. In fact, many in this small, rural town of approximately 800 residents have joined the recently-formed Opportunity Citizens Protection Association (OCPA). OCPA was formed to bring attention to local concerns about environmental degradation, and to pursue money for additional long-term research and a fund for mitigation of unforeseeable environmental effects in the future. And while OCPA maintains it is not challenging the decision to permanently store already-accounted Milltown sediments, the community is anything but happy about the plan; OCPA and the community of Opportunity have declared a commitment to block future shipments of mine waste and secure funding for ongoing investigations into potential environmental and public health ramifications. OCPA is also determined to obtain a portion of the $5 million that Senator Baucus secured in 2005 for redevelopment activities at the Milltown site. In fact the Deerlodge County Commissioner Connie Daniels maintains that the town of Opportunity deserves half of the already-allotted federal funds – $2.5 million – to compensate for its role in the Milltown cleanup. According to Daniels, "It's only fair, but downriver, folks see it differently".[22]

On the other hand, Director Stone-Manning of the Clark Fork Coalition is in a difficult position; she perceives the current situation differently and maintains the debate over the $5 million is a distraction from the bigger issue. Stone-Manning also maintains

that Opportunity residents would fare better if the community had an already-established public process and plan for redevelopment (McQuillan, 2005). This is not to suggest however, that Stone-Manning is without sympathy. As McQuillan (2005) writes,

> "She [Stone-Manning] recalls a public meeting held last year [2004] in Opportunity to unveil the Milltown cleanup plan. The presentation ended with an artist's drawing of what the Milltown area will look like once the work is done, full of color and life. As the image sunk in, one Opportunity resident raised a hand and asked, *where's our pretty picture*?"

As the slow and at-times-uncertain progress of environmental restoration all along the Clark Fork Basin demonstrates, more than a century's worth of accumulated contamination cannot simply and quickly be undone. In addition, the social impacts are too complex; individuals and corporate boards throughout Montana – and beyond, have reaped for centuries reaped the riches of mining and resource extraction. Yet the legacy and woes of these activities and era are (and will continue to be) felt by communities across Montana; similar to Milltown and Butte, MT, Opportunity is not an exception.

Conclusion

Examination of the above cases of river restoration involving proposed dam removals has produced a number of interesting findings; these suggest support for and contradictions to the propositions offered by Lowry (2003). Regarding the former, the Elk Creek case supports the association between disjointed or minor policy change and the presence of both low political receptivity to change and a decisionmaking venue largely intolerant to change. Thus, the lack of any fundamental policy change for more than twenty-five-years is a likely product of the deep polarization between the pro- and anti-dam coalitions and the low degree of tolerance for dramatic policy change at the local level and in the US Congress. In addition, the physical complexity of the proposed

dam removal, in terms of the number of (different) jurisdictions and associated decision points (e.g., ACOE, Congress, US FWS, and the US Supreme Court) has remained rather high. Together, these conditions support the proposition made by Lowry (2003) that fundamental policy change is unlikely to transpire with the sustained presence of low receptivity and tolerance to change and high physical complexity.

However, the Elk Creek case does not offer support for the association made by Lowry (2003) between the extent of policy change and the existence of readily-apparent costs of the status quo and scientific consensus on the benefits of proposed changes. At Elk Creek, both the costs of maintaining the status quo (in terms of fish mortality, development of a permanent trap-and-haul-system, and annual maintenance of the still-unfinished dam) and the degree of scientific consensus on the benefits that would come with dam removal (in terms of passive fish passage, ecosystem restoration, and long-term cost savings) have been – and continue to be – quite high. As such, the current examination of the Elk Creek case fails to yield significant support to the propositions regarding these two dimensions and the extent of policy change; the costs of maintaining the status quo at Elk Creek clearly outweigh the benefits and the policy option to reverse this situation (e.g., dam breaching) is widely supported by the scientific community.

In somewhat of a similar manner, examination of the Savage Rapids case offers both support to and raises questions of uncertainty regarding the propositions put forth by Lowry (2003). In particular, two variable categories offer support and the other two fail to bolster his predictions regarding the extent of policy change.

In terms of support, the case of river restoration via removal of Savage Rapids Dam on the Rogue exhibits both readily apparent costs of the status quo and broad-based

scientific consensus on the benefits of proposed change. Specifically, mortality rates of the threatened Coho salmon have continued to increase while GPID legal costs have mounted; these costs eventually reached a point whereby the irrigation district was bankrupted (Webster, 2005). In addition, without dam removal and thus continuance of the status quo, GPID faced the real possibility of losing its right to divert water from the Rogue because of ESA-related violations. And regarding scientific consensus, the dam has for decades been widely recognized by US FWS, US NMFS, and the BOR itself as the largest single contributor to fish mortality on the Rogue. The presence of these dimensions (e.g., readily apparent costs and scientific consensus) offers clear support to Lowry's proposition regarding the extent and magnitude of policy changes. The policy option of dam removal, representing the most fundamental type of policy change, has emerged at Savage Rapids after two-and-a-half decades of coalition interaction.

However, despite the recent emergence of this policy output, the degrees of political receptivity and tolerance to change associated by Lowry (2003) with dramatic policy change were not evidenced through examination of this particular case. Rather, the pro- and anti-dam coalitions were deeply polarized for most of the decades-long debate and decisionmaking venues – particularly at the local and state levels – were largely intolerant to the proposed changes. Dam removal, as an output of policy change, did not fully emerge until the nonfederal actors in the competing coalitions reached an agreement to remove the dam and replace it with pumps. With this agreement in place, Congress soon stepped-in and passed legislation to implement this agreement.

In addition, the history behind the Savage Rapids case involves a large number of political jurisdictions and associated decision points. At the local and state levels, these

included the GPID board of directors, the Oregon legislature, and state courts; at the federal level, these included no-less than three Department of the Interior agencies, Congress, and the federal district and appellate courts. Taken together, these relatively low levels of political receptivity and tolerance to change and the high degree of physical complexity contradict the proposition of Lowry (2003) that only minor policy changes are likely when such conditions exist. Officially slated for removal in 2003, Savage Rapids Dam and the subsequent restoration of the lower Rogue River suggest otherwise.

Of the three cases examined in this dissertation, that involving the proposed removal of Milltown Dam and restoration of the Clark Fork River lends the highest and broadest degree of support for the propositions of Lowry (2003). In fact, the only condition associated with dramatic policy change **not** present in the Milltown case relates to the physical complexity dimension. The number of (different) jurisdictions and related number of decisions points involved in this twenty-five-plus-year controversy included the US EPA, FERC, US NMFS, Congress, state and county administrative agencies, and legislative bodies.

However, despite this high degree of physical complexity, the other main elements associated with fundamental policy change in Lowry's (2003) theoretical framework were present. First, similar to Savage Rapids, the Milltown case exhibited low-to-moderate degrees of political receptivity to change. Yet in both cases, this political receptivity to change was initially low; it slowly increased over time. This suggests that policy learning on behalf of the competing coalitions (especially within the pro-dam coalition) over a relatively long period was a crucial factor for dam removal, as an output of policy change, to eventually emerge.

Second, the decisionmaking venue (ultimately FERC) from which the decision to remove Milltown Dam emerged was at least somewhat tolerant to the proposed policy change, albeit not initially. In fact, FERC had balked for years at EPA's requests that it officially weigh-in on the relicensing issue; FERC also waited until after EPA's statement to issue its official position (e.g., to accept a license surrender and turn the dam over for removal). In addition, FERC's early attempts to cover-up safety concerns about the dam suggest that at least initially, it was not wholly receptive to change (Nielsen, 2005).

Nevertheless, fundamental policy change eventually emerged, and in some respects may have been facilitated by the higher levels of receptivity and tolerance to change expressed from the array of secondary or auxiliary decisionmaking venues through which the dam removal alternative had been cultivated.[23] These auxiliary venues included the US EPA, US FWS, Montana DEQ, Missoula City Council, and the Missoula City – County Health Department. However, one could also argue that these auxiliary jurisdictions and related decision points similarly contributed to the high physical complexity of the proposed policy changes at Milltown Dam – a condition identified by Lowry (2003) as incongruent with dramatic policy change.

And third, similar to the Savage Rapids case, there has been a long history of both readily apparent costs of the status quo and scientific consensus on the benefits of proposed change in the Milltown case. In fact, the Milltown case exhibited the highest and most visible potential costs of the status quo among the three cases – namely arsenic-laden drinking water and a catastrophic release of toxic sediments; the imperiled status of the federally-listed Bull trout was a secondary cost of the maintaining the status quo. In addition, there has long-since existed scientific consensus on the benefits of proposed

change at Milltown Dam and Reservoir, dating to at least the 1982 Superfund listing of the site. The 1998 listing of the Bull trout added an additional element of scientific consensus on not only the costs of maintaining the status quo, but the benefits of proposed changes. Together, these elements may have been significant enough to offset the comparatively lower levels of receptivity and tolerance to change, especially on behalf of FERC.

In the final Chapter, the findings which have emerged in this analysis are summarized and compared relative to both the differing jurisdictional contexts, and again to the propositions put forth by Lowry in his groundbreaking (2003) study. In addition, a brief quantitative analysis is offered to generate and compare statistical associations between a host of variables and the extent of policy change outputs and the jurisdictional contexts explored in this dissertation.

Notes

[1] Lowry (2003) also examined policy change involving river restoration on Missouri's Osage River and the Colorado River as it flows through Grand Canyon National Park below Glen Canyon Dam. Regarding the former, policy change outputs were described as secondary changes, where both political receptivity and physical complexity are low; resulting policy changes are minor and are said to be the result of reluctant compromise between coalitions (and specifically not policy learning). Regarding the latter, policy change outputs were described as experiential changes, where both political receptivity and physical complexity are high; resulting policy changes are not fixed or permanent and are said to be the ongoing and adaptive and the result of policy learning, as participants monitor and assess how minor changes in one project or river segment affect the actions in others. In these cases, Lowry (2003) maintains that major policy changes are eventually possible, but only after time and significant degrees of policy learning.

[2] The Quaker Neck Dam was privately owned and operated by Carolina Power and Light, which is owned by Carolina Power Progress Energy (PE). PE is headquartered in Raleigh, N.C., is a Fortune 250 diversified energy-company with more than 23,000 megawatts of generation capacity and $10 billion in annual revenues. The company's holdings include two electric utilities serving approximately 3 million customers in North Carolina, South Carolina and Florida. Progress Energy also includes nonregulated operations covering energy marketing and natural gas exploration (http://www.progress-energy.com/aboutus/index.asp).

[3] The National Rivers and Harbors Congress consisted of local business and political leaders, contractors and industrial interests, key members of Congress (who were 'honorary' members), and ACOE officers (who were 'ex-officio' members) (McCully 1996, 254).

[4] For a discussion on the various definitions of pork barrel politics, see Hird, 1991.

[5] By 1969, the federal government had contributed over $87 billion to water development project across the country (Reuss, 2004).

[6] Safety related concerns at the Elk Creek Dam site are not significant in the debate over dam removal.

[7] In the 109th Congress, Senator Smith occupied key positions in the Commerce, Science, and Transportation Committee and the Committee on Energy and Natural Resources.

[8] From June through September when the flow is minimal in Elk Creek, there is no upstream movement of salmon under the current system. In addition, steelhead kelts are prevented from traveling downstream all year around (Klatte, 2005).

[9] Logit analysis revealed a significantly positive relation with dam removal (2.61**). The second most compelling factor(s) associated with dam removal were associated with a structure's size (smaller size correlates positively to removal; -.07**) and level of hazard (higher potential hazards from failure correlate positively to removal; .57*).

[10] www.globalsecurity.org/military/library/congress/2005_hr/050215-woodley.pdf

[11] For example Tom McMurry, a former GPID Chairman, became an opponent to proponent of dam removal during his tenure. Also, city officials Grants Pass, OR and Commissioners from Josephine and Jackson Counties have become increasingly supportive of dam removal and resolution of the ongoing controversy. And while most local officials however continue to "ride-the-fence" and not take official stances on the issue, State officials have been increasingly expressed a desire to remove the dam (Hunter, 2005; Webster, 2005).

[12] In 1994, the State of Oregon Water Resources Commission extended the temporary (1990) water right permit that allowed GPID to divert at its historical rated, provided that the District pursue with "due diligence" the replacement of the dam with updated pumps (Hunter 2005a).

[13] The Bureau's official support, on paper, may not be entirely genuine. This perspective stems from the personal interview I conducted with Ron Eggers, Manager of the Lower Columbia Area Office, US Bureau of Reclamation (Eggers, 2005). In fact, the Bureau was not involved in the settlement agreement that resulted in the 2001 Consent Decree. According to Eggers, "we [the BOR] didn't even participate in the Consent Decree ... we were invited into the lawsuit ... but here we are now, right in the middle" (Eggers, 2005). In sum, Eggers expressed a somewhat reluctant attitude about the Bureau's involvement in the Savage Rapids controversy and proposed dam removal.

[14] Nijhuis, 1998.

[15] Retrieved September 28, 2006 from http://www.klamathbasincrisis.org/Poweranddamstoc/savagerapidsdam052505.htm

[16] Published in the *Grants Pass Daily Courier*.

[17] Quoted in Duewel 2001, 6A.

[18] http://www.usbr.gov/dataweb/html/grantspass.html

[19] Sites are first proposed to the National Priorities List (NPL) in the Federal Register. EPA then accepts public comments on the sites, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing. Specifically, Section 300.425(c) of the National Contingency Plan (NCP), the federal regulation by which CERCLA is implemented (55 FR 8845, March 8, 1990), provides three mechanisms for placing sites on the NPL The first is EPA's Hazard Ranking System (HRS). The second allows states or US territories to designate one top-priority site regardless of score. The third allows

listing a site if it meets all three of these requirements: 1) the Agency for Toxic Substances and Disease Registry (ATSDR) of the U.S. Public Health Service has issued a health advisory that recommends removing people from the site; 2) EPA determines the site poses a significant threat to public health; and 3) EPA anticipates it will be more cost-effective to use its remedial authority (available only at NPL sites) than to use its emergency removal authority to respond to the site (US EPA, 2006).

[20] Backus (2005).

[21] MATTHEW W. MORRISON Senior Counsel, Environmental Enforcement Section Environment & Natural Resources Division, U.S. Department of Justice; MICHAEL J. ZEVENBERGEN, Senior Counsel, Environmental Defense Section, c/o NOAA Damage Assessment; KRIS MCLEAN, Assistant United States Attorney, District of Montana; CAROL RUSHIN, Assistant Regional Administrator, Office of Enforcement, Compliance, and Environmental Justice, U.S. Environmental Protection Agency, Region 8; D. HENRY ELSEN, Attorney, Legal Enforcement Program, U.S. Environmental Protection Agency, Region 8 Montana Office; BRIAN SCHWEITZER, Governor of Montana; MIKE MCGRATH, Montana Attorney General; ROBERT G. COLLINS, Supervising Assistant Attorney General, Montana; MARY CAPDEVILLE, Assistant, Attorney General, Montana Department of Justice, Natural Resource Damage Program; WILLIAM B. KIRLEY, Chief Remediation Counsel, Montana Dept. of Environmental Quality; JOE HOVENKOTTER, Staff Attorney, Confederated Salish and Kootenai; Tribes; STEPHEN H. FOSTER, Holland and Hart; and JEAN A. MARTIN; Atlantic Richfield Company;

[22] McQuillan (2005).

[23] This involvement and role of auxiliary decisionmaking venues that are more receptive and tolerant of policy change may also have worked to "soften" Congress in the Savage Rapids case to support the policy alternative of dam removal.

CHAPTER 8

Introduction

The purpose of this dissertation was to analyze the political dimensions of policy change involving dam removal and assess the variation in selected cases across political and administrative jurisdictions. The theoretical perspective offered by Lowry (2003) served as the guide and basis of inquiry. When applied to a wholly different set of cases involving river restoration, a number of interesting observations emerged; these lend both support to and raise questions of uncertainty regarding the findings produced by Lowry (2003) in his pioneering work into this policy domain in flux.

In Section I of this Chapter, the findings gleaned from the current research are compared relative to those of Lowry (2003). Unlike the previous Chapter, discussion is structured along the theoretical dimensions offered by Lowry (2003), as opposed to individual case studies. In light of Lowry's framework and explanation for different magnitudes of policy change, a number of interesting observations emerge from the cases analyzed. These lend both support and uncertainty, thereby suggesting avenues for additional inquiry into the political dynamics of river restoration and dam removal. Table 8.1 presents a brief comparison of the original hypotheses put forth by Lowry (2003) with the results of the current analysis. This indicates when results gleaned from the current research confirmed or failed to confirm previous expectations from the original (2003) work. Below the Table, detailed discussion is given throughout Section I for each component of the theoretical framework.

In Section II, closer attention is given to the findings derived through the current research and comparisons are made across jurisdictional contexts. A leading expectation

at the beginning of the current research was that cases involving river restoration through dam removal would vary across political and administrative jurisdiction. The tentative findings produced in this dissertation lend mixed support to this proposition; the outcome in the FERC context supported the initial expectation, while that which emerged in the BOR context raises additional questions. It is important to note that the associations produced from this research are to be considered provisional; the policy domain and changes therein represent an emergent phenomenon in the contemporary and still-unfolding politics of river restoration through dam removal.

In Section III of this Chapter, a brief quantitative analysis, similar to that of Lowry (2003), is offered to generate and compare statistical associations between a host of variables and the extent of policy change outputs across the jurisdictional contexts explored in this dissertation. Reflecting the cumulative nature of the scientific method and the accumulation of science in general, these findings are meant to augment those produced by Lowry (2003).[1]

I. Comparison of Findings to Lowry (2003)

The theoretical perspective offered by Lowry (2003) offered a number of insightful propositions regarding the degrees of political receptivity and physical complexity associated with proposed policy changes involving dam removal. Fundamentally, these suggested that high levels of political receptivity and low levels of physical complexity are more conducive for the occurrence of dramatic or fundamental policy change outputs, such as dam removal. In addition, it was posited that political receptivity to proposed changes is enhanced by the following, decisionmaking venues that are tolerant of change; the presence of high and readily apparent costs of maintaining

the status quo (e.g., no meaningful policy change); and the existence of broad-based consensus on the potential benefits associated with policy change. Similarly, the physical complexity dimension was said to be lower when both the number of political jurisdictions involved with proposed changes is low (e.g., smaller scale proposals) and the number of participants and decision points are lower.

Table 8.1 – Summary of Research Findings

Original Hypotheses		Confirmed?	
The Politics of the Situation: Political Receptivity to Change	**Elk Creek**	**Savage Rapids**	**Milltown**
1. Decisionmaking venue(s) tolerant of policy change proposals → Greater likelihood of Dam Removal	YES	NO	NO (initially)
2. High and apparent costs of maintaining status quo → Greater likelihood of Dam Removal	NO	YES	YES
3. Scientific consensus on potential benefits of change → Greater likelihood of Dam Removal	NO	YES	YES
		Confirmed?	
Characteristics of the Resource: Physical Complexity of Change	**Elk Creek**	**Savage Rapids**	**Milltown**
1. Greater number and diversity of political jurisdictions less likely to produce change → Lesser likelihood of Dam Removal	YES	NO	NO
2. Multidimensional programmatic changes are more complex; less likely to produce change → Lesser likelihood of Dam Removal	YES	NO	NO

Political Receptivity and Tolerance to Change

An examination of Table 8.1 provides support, albeit mixed, for the general propositions made by Lowry (2003). Parallel to findings in the previous work, fundamental policy change involving dam removal did emerge in the cases when political receptivity to change on behalf of the competing coalitions was at least moderate (e.g., not low). In both the Savage Rapids and Milltown cases, receptivity to change was moderate-to-lowly-moderate; it ultimately proved sufficient for fundamental policy change to emerge. Thus, coalition interaction in both cases ultimately led to the occurrence of dramatic policy change and dam removal, albeit in a protracted manner. In

the Savage Rapids case, a minimum of sixteen-years was needed for dramatic policy change to transpire; for Milltown, at least twenty-two-years had transpired. An additional source of support for the proposition of Lowry (2003) comes from the Elk Creek case, where fundamental policy change *has not* emerged in a situation defined by low political receptivity to change; to date only minor or disjointed policy change has transpired.

In the previous Chapter, Tables 7.1 – 7.3 summarized the main parties active in the pro- and anti-dam coalitions for the three case studies in this dissertation. A close inspection reveals that in the two cases where dramatic policy change has emerged (e.g., Savage Rapids and Milltown), the anti-dam or pro-removal coalitions were populated with a much greater number of elected and/or appointed decisionmakers – across levels of government – than was the pro-dam or anti-removal coalition in the case where dramatic policy change has not transpired (e.g., Elk Creek). In the Savage Rapids case, notable decisionmakers included former Governor Kitzhaber (D); two consecutively-elected US Representatives from Oregon's second district – the state's only Republican-held district; US Senator Ron Wyden (D); the Oregon Water Resources Commission and Watershed Enhancement Board; and at least two chairpersons of GPID's board of directors (former and current).[2] Similarly, in the Milltown case, notable decisionmakers included former Governor Judy Martz (R); US Senator Max Backus (D); state senator Dale Mahlum (R-MT 35th); state representative Dick Haynes (R-MT 63rd); Missoula County Commissioners Kennedy and Evans; and the 2001 Missoula City Council and County Commission.

In addition to these policymakers in the two cases, a number of administrative agencies – across levels of government – also populated the pro-removal coalitions.

Among those notably active in the Savage Rapids cases were the US FWS; US NMFS; US BOR; and the Oregon Water Resources Department. In the Milltown case, notable agencies in support of dam removal included US FWS; US EPA; Montana Department of Environmental Quality; and the Missoula City – County Health Department. In sum, for the two pro-change coalitions whose efforts ultimately proved successful in eliciting fundamental policy change, there existed a disproportionate number of policymakers and government agencies when compared to the memberships of their anti-change counterparts. Because the pro-change coalitions at Savage Rapids and Milltown were already populated with both elected policymakers and government agencies, the overall levels of political receptivity and tolerance to change would have invariably been higher when compared to the Elk Creek case, in which elected officials disproportionately populated the anti-change coalition. In fact, the only elected officials in the pro-change coalition in the Elk Creek case were former Oregon Governors Roberts (D) and Kitzhaber (D).

Thus in the Elk Creek case, there has been a persistent lack of tolerance to change at the local, state, and national levels; in many respects this continues today. According to Bob Hunter, lead attorney with Oregon WaterWatch and long-time dam removal advocate,

"What you have here [Josephine and Jackson Counties] is a very conservative area that believes dams are like the American flag. It's how the West was tamed. People believe that whenever you can get the money, you build one, and future generations will thank you".[3]

And as evidenced by Table 7.2 in the previous Chapter, a long line of policymakers from this area have been elected to the Oregon legislature to lobby against the proposed policy change at Elk Creek Dam. In addition, the Elk Creek Dam is located

in Oregon's historically-conservative second congressional district; its citizens have elected an uninterrupted series of pro-dam Republicans since 1980.[4] In the 109th Congress, steadfast support for keeping the unfinished dam in place, in hopes that it will someday be completed, continues with efforts to thwart policy change proposals on behalf of Senator Smith(R-OR) and Representative Walden (R-OR 2nd).

However, it is interesting to note that while the Savage Rapids Dam is located no more than fifty-miles downstream from the Elk Creek site, there has been less outright intolerance to dramatic policy change regarding its removal. In addition, there has been a higher degree of bipartisan political receptivity to change in the Savage Rapids case when compared to Elk Creek. In fact, Senator Hatfield – a staunch opponent of removing Elk Creek Dam – joined his colleague Senator Wyden (D-OR) in October 2000 and co-sponsored legislation (S. 3227) to authorize federal funds for removal of Savage Rapids Dam (and its replacement with pumps). And while this initial step proved unsuccessful, the two Senators reintroduced a similar measure in August 2003 with bipartisan support from Representative Walden – also a stanch opponent of removing Elk Creek Dam – and Representative Peter DeFazio (D-OR 4th). Shortly thereafter, both chambers voted to approve the Savage Rapids Dam Act (P.L. 108-37), authorizing BOR to remove the controversial dam.

Because of his district's highly conservative constituency and the (presumed) desire for reelection, the actions of Representative Walden are not all that surprising. He continues to oppose the removal of Elk Creek Dam, a federally-funded structure located in his congressional district. Yet for a federally-subsidized structure outside his district (by a measure of mere miles), it is reasonable to assume that his support for removal of

Savage Rapids Dam comes with fewer potential political costs. Likewise, in Representative DeFazio's 4th district, it is reasonable to assume that fewer potential political costs are associated with his support for removing Savage Rapids Dam – especially when the proposal had been endorsed previously by the Bureau and by all local parties via the 2001 Consent Decree.[5]

In the Milltown case, the (official) decisionmaking venue represented by FERC was at least somewhat tolerant to the proposed policy change; it had in fact authorized similar policy changes in previous instances of river restoration via dam removal. In fact, since its precedent-setting 1999 decision, which provided for the removal of Edwards Dam on Maine's Kennebec River, FERC had approved the removal of at least eight dams; it also had declined to relicense no less than ten dams across the nation for environmental reasons. [6]

However, despite its previous decisions which have facilitated dramatic policy changes, FERC's tolerance for change in the Milltown case was, at least initially, quite low. Indeed, FERC had balked for years at EPA's requests that it officially weigh-in on the relicensing issue at Milltown; FERC also waited until after EPA's statement to indicate its decision to accept a license surrender and transfer the dam to EPA for removal. In addition, FERC had previously attempted to cover-up safety concerns about Milltown Dam; this suggests that at least initially, it was not wholly receptive to change (Nielsen, 2005).

Regarding the degrees of political support and tolerance for change at Milltown among Montana's elected officials at the state and federal levels, there is clear evidence of bipartisan consensus on the potential dangers of the aging dam, and thus support for its

removal. In fact, according to both Stone-Manning (2005) and Nielsen (2005), the manner in which pro-change interests, led by the CFC, worked collaboratively to bring down the dam with the (Republican) party in power at the state level, is what ultimately proved crucial for the output of dam removal in this case. In addition once the 2005 Consent Decree was signed by all parties involved, the road was cleared for Senator Max Backus (D-MT) (senior Democratic member on the Senate Transportation Committee) to aggressively purse federal funding – a $5 million rider on a $287 billion omnibus transportation bill – to redevelop the Milltown site east of Missoula, MT (Backus, 2005). Similarly, with the Consent Decree signed, Governor Brian Schweitzer (D-MT) – the first Democrat elected to that office since 1988 – was free to applaud FERC's decision to remove the dam; prior to this, he had not taken a firm stance on the issue since replacing former Governor Judy Martz (R-MT) – who had declared her support for dam removal in 2003.

Costs of Status Quo and Scientific Consensus on Proposed Benefits

The preceding discussion highlights how low levels of political receptivity to change were compounded when decisionmaking venues are largely intolerant to policy change proposals. In the Elk Creek case, such a combination has served to stymie dramatic policy change; this adds support to Lowry's original proposition (2003). However, the same cannot be said for the second and third conditions identified by Lowry (2003) that can enhance the receptivity of coalitions toward policy change. The former assesses whether the costs (both economic and environmental) of the status quo are high and readily apparent and the latter assesses the degree of consensus on data and existing research on the potential benefits of policy change. Taken together, these two

conditions inform his hypothesis that receptivity to change increases if a) the costs of maintaining the status quo are higher and more apparent, and b) diverse interests share accurate and science-based information on future potential benefits regarding change proposals.

In the Elk Creek case, both conditions are readily identifiable; when taken together this measure fails to support the original hypothesis. Rather at Elk Creek, both the costs of maintaining the status quo (in terms of fish mortality, development of a permanent trap-and-haul-system, and annual maintenance costs) and the degree of scientific consensus on potential benefits (in terms of passive fish passage, ecosystem restoration, and long-term cost savings) have been – and continue to be – quite high. Thus, the lack of any fundamental policy change at Elk Creek for more than twenty-five-years is more likely a product of both the lack of policy learning between the pro- and anti-dam coalitions, and the low degree of tolerance for dramatic policy change at the local level and in the US Congress.

In the other two cases, where dramatic policy change has transpired, there were similarly high levels of both unambiguous costs of the status quo and scientific consensus on the potential benefits of change. And while similar to the conditions at Elk Creek, dramatic policy change did transpire at Savage Rapids and Milltown. These two latter cases thus lend support for Lowry's association between high levels along the additional dimensions of political receptivity and the increased likelihood of dramatic policy change. Specifically at Savage Rapids, the ultimate decision to remove the aging dam – a structure long-since recognized as the largest source of fish mortality on the Rogue – ended nearly two decades of political and legal debate. The planned replacement of a

modern pumping system will ensure that GPID retains its water right and method of diversion. And at Milltown, the ultimate decision in favor of dam removal – for an aging structure at the terminus of the nation's largest Superfund site and continued source of groundwater contamination – ended a similarly long history of political and legal debate. The planned removal of the site's most contaminated sediments avoids the potential for release of toxic sediments at an unprecedented scale.

This association between highly hazardous conditions and dramatic policy change supports the assumption made previously by Lowry (2003); "proponents of the status quo will be more receptive to dam removal if the dam is old, inactive, and highly hazardous" (87). In addition, restoration of the Clark Fork River will clearly benefit the threatened Bull trout and lead to an overall improvement to ecological conditions, both within the river and in association with its riparian habitats. This association between the presence of ecological concerns and dam removal also supports the proposition made previously by Lowry (2003); "the process [of dam removal emerging as an output of policy change] is faster if ecological concerns are present. Benefits are greater if they include ecological plusses" (252).

Physical Complexity: Scale and Dimensionality

As the second main dimension identified by Lowry (2003) and associated with the extent of likely policy change, the physical complexity of the proposed undertaking in question was said to be a factor of both the number of (different) jurisdictions and associated decision points involved. Examination of the Elk Creek case along these two expressions of physical complexity support the association made by Lowry (2003) between a high degree of physical complexity and diminished prospects for the

emergence of dramatic policy. At Elk Creek, dam removal would necessitate Congressional approval; in addition to this obstacle there exists a large number and variety of associated decision points (e.g., US FWS, US Supreme Court). Together, these conditions support the proposition made by Lowry (2003) that fundamental policy change is unlikely to transpire with the sustained presence of high degrees of physical complexity; the still-unfinished Elk Creek Dam continues to stand.

Nonetheless, the other two case studies in which dramatic policy change has transpired fail to support this proposition. In fact, the physical complexity involved with the proposed removals of the Savage Rapids and Milltown Dams was at least as high – if not higher – when compared to the number jurisdictions and diversity of decision points at Elk Creek. For the Savage Rapids case, these dimensions of physical complexity were manifest at the local and state level in the GPID board of directors, the Oregon legislature, and state courts. By extension, the federal level was made complex with involvement of three Interior Department agencies, Congress, and the federal district and appellate court systems. For the Milltown case, similarly high dimensions of physical complexity at the local level included administrative agencies and legislative bodies. At the federal level, complexity was expressed via involvement of the US EPA, FERC, US NMFS, and Congress. As such, the association made by Lowry (2003) between physical complexity and extent of policy change is not supported by the Savage Rapids and Milltown case studies.

Proposed Additions to Lowry (2003) in this Dissertation

In addition to region, the selection of case studies and analysis in this dissertation were based on the three primary jurisdictional or administrative contexts at the federal

level in which the politics of river restoration and dam removal are beginning to unfold (e.g., US ACOE, US BOR, US FERC). Though systematic examination of policy change among cases of proposed dam removals, differentiated by these unique jurisdictional contexts, this dissertation has sought to present a more detailed and nuanced understanding of the political dynamics of policy change. This focus has provided important comparative insights across the different contexts.

II. Comparison of Policy Changes across Political Jurisdictions

A significant goal of this research was to assess whether jurisdiction plays an independent role in determining the likelihood of dam removal as a viable output of change to traditional policies of river management. Examination of the three cases has produced mixed results; it is expected that future research into cases of river restoration and dam removal along these jurisdictional lines will lead to more established conclusions. Table 8.2 summarizes the politics of policy change across the three contexts.

Table 8.2 – The Politics of Policy Change across Federal Jurisdictions

River / Location	Jurisdiction	Political Receptivity	Tolerant of Change	Costs and Visibility of Status Quo	Scientific Consensus on Change Benefits	Physical Complexity	Size of Dam (H x W), Scale of Restoration	Age (yrs.)	Cost of Removal	Outcome
Elk Creek – southern Oregon	ACOE	Low	Low	High	High	High – to – moderate	82 x 2580	19	$ 15 million	(minor) Disjointed Change; Policy Stasis
Rogue River – southern Oregon	BOR	Low – to – moderate	Low – to – moderate	High	High	High	39 x 464	85	$12 million	Fundamental Change; Dam Removal
Clark Fork – western Montana	FERC	Low – to – moderate	Moderate	High	High	High	59 x 700	100	$120 million	Fundamental Change; Dam Removal

- The above-mentioned age of each dam was determined in 2006.

Proposed Dam Removal at Elk Creek: The US Army Corps of Engineers

"Members of Congress eager to preserve the status quo have typically rejected challenges to subsystems supporting traditional uses of rivers" (Lowry 2003, 45).

It was assumed prior to undertaking this research that the politics of policy change involving dam removal in the two contexts of federal ownership (e.g., ACOE and BOR) would involve highly complex proposals and transpire in a decisionmaking venue with low tolerance for fundamental change – especially when compared to the FERC and intergovernmental contexts. This assumption of highly complex proposed undertakings was based on the fact that policy change involving dam removal would necessarily require congressional action and approval for both ACOE and BOR structures. And when congressional approval is required to elicit a fundamental form of policy change (such as dam removal), the likelihood of such action has been described by others as slim, if not entirely out of the question (e.g., Derthick and Quirk, 1985; Lowry, 2003). In fact Lowry (2003) argued that Congress, as a venue in which coalition interactions must

transpire, is largely unreceptive to dramatic policy change proposals regarding river restoration. In particular he found that when by necessity, coalition interactions transpire in Congress, policy efforts were stymied because defenders of the status quo were (and continued to be) positioned to effectively stall meaningful and significant policy in this venue.

The twenty-plus-year *limbo-esque* status of the Elk Dam supports such a notion and has been shown here to be a product of the nature of policymaking in the US Congress. However, the recent emergence of fundamental policy change in the second case studied in the federally-owned jurisdictional context defies this notion. And based on the organizational histories of the Corps and Bureau discussed in Chapter 4 and 5 (respectively) and in particular their less-than-equal responses to the mainstream environmental movement, it seemed more logical to assume that the first dam removed in this context of federal ownership would be one owned by the Corps. This seemed especially true when considering the unfinished, inoperable status of ACOE's Elk Creek Dam in comparison to the functional and operational status of BOR's Savage Rapids Dam. In addition, ACOE has actively lobbied for congressional approval to breach the Elk Creek Dam while BOR has been far less active and eager to remove its Savage Rapids Dam.[7] According to Lowry (2003),

"The attitudes expressed by such agency [Reclamation] stalwarts as long-time Commissioner Floyd Dominy and others have been echoed and reinforced by agency personnel through the years" (51).

In addition to these assumptions made prior to completion of the current research, it was assumed that of the three federal contexts in which the politics of dam removal are beginning to transpire, the FERC context would continue to yield the greatest frequency

of fundamental policy changes – with the least delay and highest degrees of political receptivity and tolerance to change. This assumption stems from the series of recent dam removals in the FERC context. By far, the greatest numbers of federally-regulated dams in the US that have been removed were a product of the FERC licensing and relicensing processes. In addition, clear policy change designed to facilitate dam removals has emerged in direct relation to FERC; as discussed in Chapters 2 and 6, precedent was set with the 1986 passage of the Electric Consumers Protection Act. Since then, FERC has had the statutory authority to order a dam's removal *without* congressional approval; it has implemented this policy option no less than twenty times since 1995 for environmental reasons.[8] In three of these instances, FERC's removal order was issued against the wishes of both the dams' owners and the hydropower industry.

Proposed Dam Removal at Savage Rapids: The Bureau of Reclamation

"The agency [US BOR] *is willing to think about restoration efforts now and* [this] *even includes dam removal as a possibility"* (Lowry 2003, 51).[9]

As stated in the previous section, the recent emergence of fundamental policy change from the Savage Rapids case and the imminent dam removal as an output of this change defies expectation. Unlike the developments for the Corps' Elk Creek Dam, Congress has approved dam removal at Savage Rapids – the most fundamental and permanent expression of policy change – after nearly two decades of inaction. In fact, this output of policy change was wholly unexpected at the time this dissertation's proposal was being formulated during the spring of 2003. As discussed previously, it was expected that policy change of a lesser magnitude would ultimately emerge in the Savage Rapids case, not only because of the requirement for congressional action, but

also because of the dam's situation in the jurisdictional context of the US Bureau of Reclamation.

Indeed, previous research has pointed to the US BOR as the federal agency least likely to not only endorse removal of a dam under its jurisdiction, but also to quickly respond to the instructions of Congress that it initiate contracts for actual removal operations (e.g., McCool, 1987; Reisner and Bates, 1990; Reisner, 1993; Bates et al., 1993; Clarke and McCool, 1996; McCully, 1996; Espeland, 1998; Martin, 1999). Yet in the Savage Rapids case, this is exactly what has transpired. The Bureau first endorsed the policy option of dam removal in its 1995 EIS; after Congress passed the Savage Rapids Dam Act (P.L. 108-37) in August 2003, the BOR awarded a Salem, OR based construction outfit the first part of its $28 million federal contract in August 2006 to remove Savage Rapids Dam.[10] The project and subsequent river restoration is scheduled for completed by 2009 (IRN, 2006b).

Why has this example of fundamental policy change emerged from the BOR jurisdictional context? A possible suggestion comes from the argument of Bowersox (2000), which suggests the Bureau – once perched on the verge of termination during the 1980s and early-1990s – has responded in "unique and innovative ways" to new environmental mandates, particularly water quality issues related to "total maximum daily loads" (TMDL) or concentrations of non-point pollution sources. Further, he suggests that despite significant reductions to its budget and personnel, BOR has emerged as a model, cooperative agency in the (current) era of regulatory devolution. Consider the following statement.

"Although occasionally seeking to promote its traditional mission of water development and facilities construction (albeit with a new environmentally friendly focus), the Bureau

has demonstrated considerable aptitude at playing the role of resource manager (rather than developer) and technical consultant to cash-strapped state and municipal authorities. As such, the Bureau's experience demonstrates the continued relevance of traditional federal bureaucratic agencies despite the decentralizing tendencies in environmental policy making that have been so evident in the last decade..." (Bowersox 2000, 500).

The argument put forth by Bowersox (2000) is specifically related to the Federal Water Pollution Control Act Amendments (FWPCAA) of 1972 – otherwise known as the Clean Water Act. Section 303 of this Act required the establishment of TMDL levels for water bodies classified as Water Quality Limited Segments (WQLS); subsequent enforcement of these fundamentally altered the course of public water quality policy throughout the nation (Bowersox, 2000). And today, the State of Oregon's WQLS/TMDL regulatory regime has been combined with endangered species recovery plans for its numerous federally-listed salmon and steelhead populations. This covers more than 1,183 listed water bodies totaling an affect 14,534 river miles (Bowersox, 2000).

Due to the regulatory complexities of such a program, Oregon has been forced to collaborate with federal agencies because of the State's lack of both technical and financial resources and statutory authority (regarding implementation of the ESA). Due to this, Bowersox (2000) suggests that in order to 'reinvent' itself and obtain new missions, the Bureau began reconnaissance studies for new water storage facilities (e.g., new dams and reservoirs). For a period of nearly seven years, these proposed facilities were touted as an effective means to provide augmented river and stream flows to dilute existing surface water supplies and thus attain compliance with TMDL requirements. According to the Bureau, new storage facilities would allow Oregon to attain TMDL compliance, because TMDLs were written in the form of a ratio of pollutant to ambient water.

Addressing the source of TMDL-related pollution was not the priority. Between 1987 and 1993, these reconnaissance projects – so-called 'water quality dams' were funded by Congress until ultimately "killed" from a combination of environmental activism, local protests, property rights advocates, and fiscal conservatives (Bowersox, 2000).

After this setback, the Bureau is said to have begun the search for alternatives (to dam construction) in order to remain a relevant bureaucratic player. Ironically, Bowersox (2003) discusses how BOR shifted its focus and subsequent activities from dam construction to dam removal. Because it was ultimately prevented from constructing a series of these planned water quality dams, BOR became an active participant in the planned removal of the Jackson Street Dam, an outdated irrigation structure in the city of Medford, OR. This dam removal was a key feature of the plans developed by BOR, the City of Medford, Douglas County, and state regulators to increase the velocity of water in local waterway (Bear Creek) that had been targeted for TMDL regulation. With dam removal and a freer-flowing Bear Creek, TMDLs for temperature, nutrient loads, and turbidity could be attained at a reduced cost to the local and state agencies involved. In addition, ESA concerns over the threatened Rogue River population of Coho salmon could be addressed more effectively (and more cheaply).

In July 1998, the Jackson Street Dam, standing at 11-feet and spanning a length of 120-feet, was removed with BOR involvement. Built in 1960 and owned by the Rogue River Valley Irrigation District, the dam's removal cost $1.2 million. Primary funding was provided by the State of Oregon, via its lottery-funded Watershed Enhancement Program. Additional funds were provided by the City of Medford, a state non-profit organization (Oregon Trout), and the US BOR (American Rivers, 1999).

Initially, this sort of opportunism by the Bureau allowed it to cultivate and exploit an indirect mandate to pursue its most traditional mission – the development of water storage projects. Its proposed clean water dams were effectively marketed (albeit brief) as a means to attain TMDLs via the newly-coined method of "water quality flow augmentation". The projects proposed by the Bureau ranged in size from small dams and reservoirs around 18,000 acre-feet to large dams with reservoirs in excess of 100,000 acre-feet; the proposed larger-scale projects were marketed by BOR to serve additional constituencies, including irrigation, industries, and municipalities (Bowersox, 2000).

Given the aggressive nature with which the agency pursued its water quality dams, Bowersox (2000) contends that Bureau officials had ambitions to regain the level of funding and prestige they enjoyed during the dam-building heyday. When public concern and political pressure brought an end to this short-lived BOR plan, the agency turned to dam removal as an area of future activity and source of funding. Such an inconsistent and erratic pursuit of contradictory missions is akin to Clarke and McCool's (1996) portrait of the Bureau as an agency struggling to reinvent itself and remain relevant. In addition, the relevancy of the argument made by Mann (1975) that regulatory and distributive politics go together in water policy is similarly confirmed.

Taken together, these previous actions at Bear Creek and the Bureau's current involvement (and support) for the Savage Rapids Dam removal support the general conclusions made by other accounts of the BOR's actions and behaviors in the post-NEPA, post-large dam era, whereby the agency is in a desperate rush to define for itself a new mission and secure future appropriations (e.g., Reisner, 1993; Clarke and McCool, 1996; Espeland, 1998; Bowersox, 2000; Lowry, 2003). With the eclipse of the

monumental federal dam construction era, conservation, reallocation, and transfers among users are destined to be the new issues in water policy; distributive policy will continue to give way to issues of redistribution. As such, examination over where and how the Bureau responds will remain a relevant area of study and continuing insights are to be expected.

In the meantime, the significance of Jackson Street Dam's removal should not be underestimated. Not only was it prototypical of the Bureau's current efforts to expand its traditional mission and begin engaging selected dam removals; it also represented the first concrete irrigation dam removed in the Rogue River basin and the first Oregon dam ever removed in order to restore Coho salmon (American Rivers, 1999). The imminent removal of the Savage Rapids Dam will further this trajectory and set additional precedent. Most significantly, it will be the largest undertaking of dam removal by the Bureau; it also represents the first time a BOR-dam will have been removed at the request of Congress. It remains to be seen however whether this magnitude of policy change will be reflected in other cases of proposed river restorations involving BOR (and ACOE) projects.

Proposed Dam Removal at Milltown: the Federal Energy Regulatory Commission

"In the last ten or twenty years, our mandate has changed so that we [FERC] *have a charge of balancing developmental and non-developmental issues. Over time, we've been implementing those changes in a constant tweaking of the process"* – Allan Creamer, FERC Hydropower Licensing Official.[11]

As discussed previously in this Chapter, emergence of the policy change output involving dam removal in the FERC jurisdictional context was not wholly surprising or unexpected. Rather, when compared to the other two federal contexts, FERC not only has the statutory authority to order a dam under its jurisdiction removed – without

congressional authorization, it has previously implemented the policy provided by the 1986 EPCA in a number of instances. As discussed in Chapters 2 and 6, while FERC has historically been reluctant to order the decommissioning of a dam, it has recently shown some willingness to choose the environment over hydropower.

What was unexpected about FERC's order to remove Milltown Dam relates to its initial attempts to cover-up safety concerns about the dam. At various times between 2000 and 2002, the FERC censored information it had previously divulged on its website regarding foot-wide gaps near the foundation of the aging Milltown Dam had (Nielsen, 2005; SEJ, 2003). Because FERC had ordered a number of previous dam removals – sometimes at the disapproval of their owners, its opposition to similar policy change proposals on ideological or political grounds seemed unlikely. Beyond citing concerns that terrorists might exploit such information in the post-9/11 world, what other motivations might FERC have had to suppress critical public safety information? If there was in fact no collusion between FERC, ARCO, and Montana Power Company, why did FERC issue a dramatic public apology immediately after its censorship of safety information was exposed? Future research may seek to answer these and related questions.

III. Conditions Making Dam Removal More Likely: Lowry (2003)

"One study of costs and benefits of the more than 5,000 large dams on American rivers states that only two (Hoover and Grand Coulee) are obviously justifiable" (Lowry 2003, 61).[12]

To provide insight into the issue of when, or under what conditions, dams are more likely to be removed, Lowry (2003) offered a series of rather straightforward results. Through a sequence of bivariate statistical analyses, he found that size (as a

proxy for complexity) is positively correlated to removal.[13] In addition, to suggest the importance of political receptivity, he found that age, inactivity, and levels of hazard are each positively related to dam removal; these factors suggest that removal is more likely when costs of maintaining the status quo are higher. By extension, he asserts that when such costs are high and readily apparent, proponents of maintaining the status quo will be more receptive to policy change proposals involving dam removal; status quo proponents will also be more willing to cooperate with members in the pro-change coalition(s).

In addition to presenting these conditions said to facilitate policy change in the direction of dam removal, Lowry (2003) also assessed the speed at which dramatic policy change such as dam removal occurs. Because this dependent variable (e.g., length of time) is continuous and not bound (e.g., it is not dichotomous), he is able to assess this variation along a series of independent variables via multiple regression analysis. A series of subsequent multivariate relationships were offered to explain the variation among cases where dam removals have transpired and specifically, the length of time between the date of the initial policy change proposal and that of the actual removal. And because he found the independent variables of cooperation and inactive status – and – cooperation and ecological concern – to be highly correlated (e.g., high multicollinearity), he chose to examine three different equations in order to prevent this from producing spurious results.[14]

In general, Lowry (2003) found that policy change involving dam removal occurs more quickly when the dams in question are older, inactive, and hazardous; by extension dam removal transpires more quickly when receptivity to change is higher. In addition,

Lowry (2003) found that the progression of policy change is quicker if ecological concerns are present.[15]

These results are explained by Lowry (2003) primarily in terms of the costs and benefits associated with proposed dam removals. In particular, he stated that the perceived benefits of a proposed policy change are greater if they include so-called "ecological plusses". In addition, the repair and maintenance costs incurred by dam owners are higher when dams are old and highly hazardous. Together, these conditions are said to increase political receptivity and tolerance to change, as affected by the high and readily apparent costs of maintaining the status quo and high consensus on the benefits of proposed change. In the end, not only do such conditions increase the likelihood of policy change and dam removal from transpiring, they also decrease the length of time needed for such policy outputs to emerge (Lowry, 2003). These findings are consistent with those found in a previous qualitative analysis of dam removal in Wisconsin by Born et al., 1996.

As a means to assess the validity of these previous findings, the following section presents a brief quantitative analysis of cases involving proposed dam removals in the American West. Due to time and resource considerations, the current analysis is limited to a bivariate assessment, similar to that offered by Lowry (2003) As the dependent variable, I assess whether policy change proposals have resulted in 1) dam removal; 2) some form of structural modification to provide for passive fish migration; and 3) no action.[16]

This replication of Lowry's (2003) analysis provided the opportunity to include additional cases that have emerged since 2000, when data collection ended in the

previous study. In addition, this replication provided the opportunity to assess the impact of the additions to the previous study proposed in Chapter 3 of the current dissertation. Specifically, these include jurisdictional context; the relative presence of a federally-listed species (threatened or endangered); and both the size of reservoir impounded by the dam and the number of river miles above the dam to be restored. Incorporation of the jurisdictional component augments Lowry's (2003) previous qualitative measure of physical complexity (e.g., number of jurisdictions and decision points involved). The addition of enhanced size and restoration measures also complement the previous measures employed by Lowry (2003).

IV. Analyzing the Varied Outputs of Policy Change and River Restoration

The general descriptive statistics are presented below in the Appendix. Separate methods of analysis were required because of the different levels of measurement among the variables. For the six variables capable of operationalization beyond the nominal level of precision, the mean statistic and standard deviation are presented as measures of central tendency. For the remaining four variables, measured at the nominal (or categorical) level, their frequencies are presented. Together, these variables describe a number of the variables used to assess the variation in the magnitude of policy changes involving efforts to restore rivers and associated ecological and cultural resources.

Descriptive Determinants of Policy Change

In order to provide for the following discussion, cases defined by the three different magnitudes of policy change (e.g., dam removal, structural modification, no action) were isolated and assessed relative to the above-mentioned descriptive measures. Specifically these are age, cost, and physical complexity. A number of compelling

insights emerged; most notably there is clear evidence between these descriptive measures and the extent of policy change.

When excluding from analysis the six cases where significant policy change has not transpired, the mean age for dams that have been either removed or structurally-modified to facilitate passive fish migration was roughly sixty-eight years. This is slightly higher than the mean age for all cases. And while Lowry (2003) did not list such a statistic for the dam removals studied previously, this age is quite similar to those removals he studied previously (Quaker Neck Dam was removed in 1997 and Edwards Dam came down in 1999). In a related context, the mean year of policy action for cases involving notable change was 1998. Of the some twenty-nine dams removed in 1998, at least two were identified by Lowry (2003) as being located in the western US. And of the fifteen-odd dams removed the following year, at least three were located in the western US (American Rivers, 1999).[17] Each year since then, the number of dams both removed and slated for removals has either remained constant or increased dramatically.[18]

When further isolated by the type and/or extent of policy change, the variables used in the generation of the Appendix provide compelling insight into various dimensions of the sheer physical complexity associated with planned river restorations. For those cases involving dam removal, the mean size of the structures already removed or those slated for removal was roughly 21, 101-feet (a composite measure of overall dam height and length).[19] In addition to sheer size, these structures impounded reservoirs with a mean volume of approximately 380,090 acre-feet; dam removal and reservoir drawdown has (or will imminently) lead to restoration of just over 72 miles of

upstream habitat. For the cases whereby the physical structures have been significantly modified to provide for passive fish migration, these measures of size and scale of restoration efforts increase substantially, suggesting that sheer physical complexity has a significant role in affecting the extent of policy change. Specifically, for dams that have been structurally modified, their mean size was approximately 706,433-feet; upriver restoration has targeted reservoirs of roughly 782,244 acre-feet in volume and approximately 62 upriver miles. And in comparison to these cases involving either dam removal (actual or imminent) or significant structural modification, the cases whereby no lasting policy change have emerged are defined by significantly larger degrees of physical complexity. The mean size of the structures was approximately 1,241,018 feet; mean reservoir impoundment was roughly 31,720, 394 acre-feet; and restoration efforts would target some 170 upriver miles. Apparently, size does matter.

V. Variation in Policy Change across Political Jurisdictions

It was a fundamental goal of this dissertation was to assess the extent of river restoration and policy change across the predominant jurisdictional contexts in which the politics of change currently transpire. In order to assess this variation across jurisdiction, it was necessary to employ the use of a dummy (dichotomous) variable in order to comply with basic statistical protocol. This was easily achieved by assigning the dummy variable (0) to three jurisdictional contexts at a time while scoring the fourth context as (1). This practice was then repeated each time (for a total of four runs) for each context in question. This procedure allowed for bivariate correlations to be run whereby each jurisdictional context could be isolated and analyzed independently.[20] The results, presented in Table 8.3, suggest the presence of statistically significant correlations for

each jurisdictional context and the magnitude or extent of policy change that has transpired.[21] Apparently, jurisdiction matters too.

Table 8.3 – Relationships between Jurisdiction and the Extent of Policy Change[a]

	Extent of Change
Federal Agency Context	
Army Corps of Engineers	-.283*
Bureau of Reclamation	-.522**
Federal Energy Regulatory Commission	.294*
Intergovernmental	.457**
	(n=55)

[a] Pearson correlation coefficient
* Statistically significant at the .05 level
** Statistically significant at the .01 level

In each of these analyses, jurisdiction was evaluated as a separate variable; in all cases a statistically significant correlation with the extent of policy change emerged. Further, in each instance the direction of correlation between jurisdiction and type of policy change supports the original hypotheses. In both the ACOE and BOR contexts, jurisdictions defined by federal ownership and operation, a moderately strong and negative correlation emerged between each jurisdiction and the extent of fundamental policy change. Because higher scale scores were assigned to represent more dramatic or extensive types of policy change (such as dam removal), the negative correlation suggests that the federally-owned and –operated context is not positively associated with dramatic policy change. Thus, a negative linear association emerged between the jurisdictional contexts of the Corps and Bureau and higher magnitudes of policy change.

In the FERC context, a moderately strong and positive correlation emerged between jurisdiction and the extent of fundamental policy change. Again, this reflects the scoring scheme used to reflect the original hypothesis that policy changes of a greater extent would be more likely in the FERC context when compared to that of either the ACOE or BOR.

And while it was not a primary focus in this dissertation, the intergovernmental context yielded the strongest, positive correlation between jurisdiction and the extent of dramatic policy change. Similar to the previous correlations, the direction of this association is a function of the scoring scheme used to reflect the initial hypotheses. Future research may seek to explore this jurisdictional context in greater detail, perhaps through comparative analysis on the political dimensions of dam removal between or among states. In addition, as Lowry (2003) previously suggested, the comparative analysis of river restoration and policy change between or among river basins may likely yield valuable insights. Finally, the intergovernmental context presents no shortage of cases to study, given that roughly thirty-percent of the 77,000-odd dams listed in the Corps' NID are owned by either local or state governments, or by public utilities (Aspen Institute, 2002).

VI. Variation in Policy Change: Additional Correlations

Beyond jurisdictional context, this dissertation intended to assess the impact of additional variables on the extent of policy change and river restoration. The results are presented in Table 8.4. For a number of these variables – age, functionality, and size in particular, previous research has uncovered similar associations with dam removal (e.g.,

Born et al., 1998; American Rivers et al., 1999; Grossman, 2002; Aspen Institute, 2002; Lowry, 2003).

To capture an element regarding the interactions of pro- and anti-change coalitions, a simple measure of cooperation was constructed by determining the percentage of parties involved that were in favor of substantial policy change involving either structural modification of outright dam removal. Admittedly this is somewhat of a crude measure, but the percentage of cooperation to elicit policy change is readily available via examination of the major parties involved in a given case; this is oftentimes reflected in consent decrees, transcripts of FERC negotiations, and/or parties involved in related lawsuits. In addition, this is identical to the method of operationalization used by Lowry (2003) in his brief statistical analysis. The moderately strong and positive correlation between this variable and the extent of policy change lends support to the previous hypothesis that fundamental policy change is more likely to emerge in cases of river restoration with high levels of cooperation and agreement on the necessity of changing the status quo.

In addition to the relative presence of cooperation among members of competing coalitions, a number of variables related to overall physical complexity were used to assess the variation in the extent of policy change in the domain of river restoration. The age of the dam exhibited a moderately strong and positive correlation with increased magnitudes of policy change; this lends support to the commonsensical assumption that older structures are more likely to be removed or significantly modified than those constructed more recently. Similarly, a dam's physical size (length *x* width in feet) exhibited a strong and positive correlation with increased magnitudes of policy change;

this supports the rational assumption that smaller dams are more likely to be removed or significantly modified that larger, more physically-complex structures. In a related context, the size (volume in acre-feet) of the reservoir impounded by a dam exhibited a negative correlation with increased magnitudes of policy change; apparently the drawing-down or draining of a large reservoir that would accompany a dam's removal lessens the likelihood of dramatic policy change.

And finally, a moderately strong and positive correlation emerged from this analysis between the operational or functional status of a dam and an increased magnitude of policy change. Similar to the associations between age, size, and cooperation, the increased likelihood of removing a dam that is functionally obsolete is a rational or commonsensical proposition. Nonetheless, the case involving the Corps' Elk Creek Dam discussed in Chapter 4 defies such a proposition.

Table 8.4 Additional Characteristics of Federal Dams and the Extent of Policy Change[a]

Characteristic	**Extent of Policy Change**
Cooperation	.523**
Age	.544*
Size	-.606**
Status (Functional versus Non)	.498**
Reservoir Size	-.379**
	(n=55)

[a] Pearson correlation coefficient
* Statistically significant at the .05 level
** Statistically significant at the .01 level

Conclusion

In large part, Lowry's (2003) seminal work was driven by a belief that the extent of changes for individual cases of river restoration within the (current) broader policy shift will vary considerably. Thus, while specific restoration cases involving dam removal have become more commonplace and will presumably continue to gain coverage and support, such efforts differ drastically. Some target structures less than a few feet in size, which engender no real controversy or complexity; other efforts target seemingly immovable, iconic structures that engender extreme controversy and involve incredibly complex plans. By extension, the levels of media coverage and political attention river various restoration efforts attract vary considerably. For some, the sheer notion of dismantling a fully-functioning dam is something akin to blasphemy while for others, dams fail to make any rational sense – ecologically, economically, or socially. Yet Lowry (2003) is correct in asserting that a new era of river restoration has set in motion; each year dams in greater numbers and involving increased complexities are slated for removal. This dissertation has sought to further expose the political determinants behind this fundamental shift in politics and policy.

In doing so, this dissertation has focused on the predominant jurisdictional contexts at the federal level in which these policy shifts have and will continue to transpire. As expected, support has emerged that jurisdiction has an independent role in determining the likelihood of dramatic change. One might expect the trends and associations uncovered herein, between jurisdiction and policy change, to continue. Thus, as precedent upon precedent is set – with the planned removal of larger and more complex dams – it is logical to assume that the politics of river restoration are just

beginning to elicit fundamental policy changes. Indeed, since Lowry's (2003) work was completed, an astonishing number of policy actions have called for implementation of the dam removal alternative. This is especially true for the removal of the Bureau's Savage Rapids Dam.

It seems certain that future research will focus on the advancement of these and other unprecedented occurrences of river restoration involving dam removal. Such cases are bound to include the following, removal of two enormous dams on Washington's Elwha River and one on the state's White Salmon River; the immanent removals of southern California's two most infamous dams (Matilija and Rindge Dams); the almost-certain decommissioning of two large dams that comprise FERC's Klamath River Project; and notwithstanding, the first-ever removal of the Bureau's Savage Rapids Dam in Oregon and the removal of Milltown Dam in Montana at the terminus of the nation's largest Superfund site.; of Reclamation's first BOR-owned dam. Building upon the foundation provided by Lowry (2003), this dissertation has provided additional insight and tools for future researchers to examine these (and other) cases as they dramatically unfold.

Notes

[1] SPSS 14.0 was used as the statistical software package.

[2] The Oregon Water Resources Commission consists of seven members, five of who represent different regions of the state (e.g., Northwest; West Central; Southwest; North Central; and Eastern). The remaining two members are designated as "at large" members of the Commission (http://www.oregon.gov/OWRD/COMMIS/index.shtml).

[3] Quote taken from Jacobson, 1998.

[4] Previous to this, Oregon's second district was held by Democrat Albert C. Ullman between 1957 and 1980.

[5] Nonetheless, the support for dam removal at Savage Rapids and not Elk Creek offered by Senator Smith less directly explained, especially when considering that his intended constituency is the *entire* State of Oregon as opposed to more limited, individual congressional districts.

[6] Newport #11 Dam was removed in 1996 (VT); Grist Mill Dam was removed in 1998 (NH); Columbia Fall Hydro Dam was fully removed in 1998 (ME); the Mokelumne Project was removed in 2000 (CA); the Smelt Hill Dam was removed in 2002 (ME); Creek Dam was removed in 2002 (OR); East and West Panther Creek dams were removed in 2002 as part of a larger FERC-negotiated settlement (CA); and Sturgeon River Dam was removed in 2003 (MI). Environmental conditions placed by FERC on a relicense application for the Cushman Hydroelectric Project rendered it uneconomic in 1998 (WA); Condit Dam was ordered for removal in 2002 (WA); agreement reached to remove Bull Run Hydro Dam in 2002 (OR); agreement reached to remove the Powerdale Hydro Dam in 2003 (OR); agreement reached in 2003 to remove the American Fork Project in (UT); Marquette City Dam #1 was ordered for removal by FERC in 2004 (MI); the Elwha River and Glines Canyon Dams (FERC-regulated dams until 1992) were ordered for removal in 2004 (WA); the Irving/Childs Hydropower Dam was ordered for removal in 2005 (AZ); and agreement finalized to remove Milltown Dam in 2005 (MT).

[7] This sentiment was clearly evident when I personally interviewed the Bureau's Area Manager of its Lower Columbia Area Office, Ron Eggers. During the summer 2005 interview, Mr. Eggers' tone and attitude towards the proposed removal of Savage Rapids Dam were largely dismissive, apathetic, and disapproving. In particular, Eggers expressed his disapproval of the manner in which the settlement to remove the dam was reached; in particular he was dissatisfied with BOR's lack of involvement and its subsequent placement in charge of the restoration project. Eggers also sought repeatedly to distance and disassociate BOR from the project; he appeared to be attempting to downplay the Bureau's role.

This general impression with which I was left after speaking with Eggers was reinforced after my personal interviews with his ACOE counterpart, Jim Buck, the operations manager for the Corps' Rogue River Basin Project. Buck expressed an obvious excitement and genuine approval regarding the Corps endorsement of the notch-based proposal at Elk Creek. This posture was reinforced when I personally interviewed another ACOE employee, Bernard Klatte, a fisheries biologist with the Corps. Like Buck, Klatte was enthusiastic and clearly supportive of the Corps' notch-based proposal. In addition, he was rather straightforward in expression his lack of confidence in the trap-and-haul fish passage regime currently used at Elk Creek Dam.

[8] As of February 7, 2006 dam removal as the primary method of river restoration emerged from the FERC licensing process for the following projects: Newport #11 Dam was removed in 1996 (VT); Grist Mill Dam was removed in 1998 (NH); Edwards Dam was removed in 1999 (ME); Columbia Fall Hydro Dam was fully removed in 1998 (ME); environmental conditions placed by FERC on a relicense application for the Cushman Hydroelectric Project rendered it uneconomic in 1998 (WA); the Mokelumne Project was removed in 2000 (CA); the Smelt Hill Dam was removed in 2002 (ME); Condit Dam was ordered for removal in 2002 (WA); Woods Creek Dam was removed in 2002 (WI); Rock Creek Dam was removed in 2002 (OR); East and West Panther Creek dams were removed in 2002 as part of a larger FERC-negotiated settlement (CA); agreement was reached to remove Bull Run Hydro Dam in 2002 (OR); Sturgeon River Dam was removed in 2003 (MI); agreement was reached to remove the Powerdale Hydro Dam in 2003 (OR); agreement was reached in 2003 to remove the American Fork Project in (UT); Marquette City Dam #1 was ordered for removal by FERC in 2004 (MI); the Elwha River and Glines Canyon Dams were ordered for removal in 2004 (WA); the Irving/Childs Hydropower Dam was ordered for removal in 2005 (AZ); and an agreement was finalized to remove Milltown Dam in 2005 (MT).

[9] In this quote, Lowry (2003) is summarizing a 2000 discussion he had with Steve Magnussen, director of the Bureau's Western Water Operations.

[10] The Slayden Construction Group Inc. received the Bureau's contract to remove Savage Rapids Dam.

[11] Quoted in Lowry 2003, 53-54.

[12] Devine, R.S. 1995. The trouble with dams. *Atlantic Monthly*, 276, 2 (August):64-74.

[13] N = 72; 36 cases where dams were removed and 36 where dam removal did not transpire.

[14] Multicollinearity refers to the linear inter-correlation among variables. Simply put, if nominally "different" measures actually quantify the same phenomenon to a significant degree they are considered redundant (i.e., redundancy may occur when the variables are given different names and employ different numeric measurements and subsequently correlate highly with each other.

A principal danger of such data redundancy is referred to as over-specifying or over-fitting a regression analysis model. The most robust regression models are those in which the predictor variables each correlate highly with the dependent (outcome) variable but correlate at most only minimally with each other. Such a model will be statistically robust (i.e., it will predict reliably across numerous samples of variable sets drawn from the same statistical population).

[15] The following statistically significant findings, generated via ordinary least squares regression (OLS) analysis, indicate the strength and robustness of the following independent variables in facilitating dam removals. Since the dependent variable represents the length of time between policy change proposal and actual dam removal, the negative signs specify that the various independent variables reduced this time. In other words, the independent variables worked to speed-up the process of dam removal. When an equation was run without the Cooperation variable and with the Safety variable – Ecological Reasons (-5.21**); Level of Hazard (-1.62**); and Years in Existence (-.038**). When a separate equation was run without (only) the Cooperation variable – Ecological Reasons (-3.34*); Inactive Status (-2.06*); and Years in Existence (-.039**). When a third and separate equation was run with the inclusion of the Cooperation variable – Level of Hazard (-.621*); Cooperation (-.167**); and Years in Existence (-.026*).

[16] The category of dam removals includes dams that have already been removed and those which have been officially slated for removal. This latter context was included since this dissertation is focused on examining the outputs of policy change; the politics of budgeting and/or appropriation of funds necessary for actual dam removal are not the primary focus. Nonetheless, may of the cases scored as having involved an actual dam removal have, in fact, not. Rather, there has been an official decision made authorizing removal; in the federal context, this takes the form of Congressional action; for FERC, this is reflected in a consent decree and/or application to surrender a license; and in the intergovernmental context, this takes the form of a state or sub-state legislative order.

In addition, I use the term "passive fish migration" to qualify what is considered a structural modification. As such, for cases positioned in this category, significant modifications to a dam's physical structure have been implemented. These include the following, installation of fish screens or weirs; fish ladders; raceways or terraced bypass channels around dams; and/or hydraulic mechanisms to provide for temperature-appropriate discharges or spillway releases. Thus, passive fish migration does not include measures such as mechanized transport, barging, or truck-based transportation of fish. These are not considered passive means of fish recovery.

[17] According to American Rivers (2005a; 2006), two dams in the western US have been slated for removal in 2006; also in the West, two were removed in 2004, eleven were removed in both 2003 and 2002; two were removed in 2001; three were removed in 2000; and three were removed in 1999.

[18] In both 1999 and 2000, three dams were removed in the western US; two were removed in 2001; eleven were removed in both 2002 and 2003; and two were in and 2004 (American Rivers, 1999).

[19] As an interest note, the cases analyzed by Lowry (2003) involving dam removal targeted much smaller structures. Edwards Dam was some 917 ft (L) x 24 ft (H) = 22,008 ft in total size. Quaker Neck Dam was roughly 260 ft (L) x 7 ft (H) = 1,820 ft in total size.

[20] In bivariate statistical analysis (Pearson's "r" used in this case) a correlation based on the use of a non-binary nominal-level (categorical) variable is both an improper technique and the output is nearly impossible to interpret in any meaningful way (Davis, 2006). If the jurisdictional variable could have been operationalized at a higher level of specificity, with demonstrable ranked differences among variables, a

more sophisticated statistical analysis could have been performed.

[21] The Pearson Product-Moment Correlation Coefficient was the chosen method of analysis. It is defined as the sum of the products of the standard scores of the two measures divided by the degrees of freedom. The result obtained is equivalent to dividing the covariance between the two variables by the product of their standard deviations. In general the correlation coefficient is one of the two square roots (either positive or negative) of the coefficient of determination (r^2), which is the ratio of explained variation to total variation.

Appendix

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
						Stat.	Std. Error	Stat.	Std. Error
Age at removal, modification, or no action	52	19	116	65.31	23.75	.14	.33	-1.07	.65
Year removal or modification	53	1957	2006	1998.53	10.11	-2.40	.33	8.45	.64
Height x Width in feet	48	80.0	2872650	487705.83	711625.93	1.56	.34	1.74	.67
Volume reservoir impounded by dam (acre-feet)	48	.00	125000000	3702089.48	18320019.84	6.48	.34	43.32	.67
Number river miles above dam restored with removal or modification	35	1.50	500	76.33	121.02	2.61	.40	6.13	.78
Cost removal; structural modification	32	$46,300.00	$180,000,000	$41,545,544.63	$53,902,654.67	1.13	.41	-.13	.81

Frequency Tables

Predominant Jurisdictional Context[1]

		Frequency	Percent	Cumulative Percent
Valid	1	13	23.6	23.6
	2	9	16.4	40.0
	3	22	40.0	80.0
	4	11	20.0	100.0
	Total	55	100.0	

* 1 = US BOR; 2 = US ACOE; 3 = FERC; 4 = Intergovernmental Context

Status of Dam at Decision Time (Operational versus Non)

		Frequency	Percent	Cumulative Percent
Valid	0	37	67.3	67.3
	1	18	32.7	100.0
	Total	55	100.0	

* 0 = Yes; 1 = No

Public Safety Risks Posed by Dam's Presence

		Frequency	Percent	Valid Percent
Valid	0	42	76.4	76.4
	1	13	23.6	23.6
	Total	55	100.0	100.0

* 0 = No; 1 = Yes

Endangered or Threatened Species Concerns at Dam

		Frequency	Percent	Valid Percent
Valid	0	7	12.7	12.7
	1	48	87.3	87.3
	Total	55	100.0	100.0

* 0 = No; 1 = Yes

[1] The number of cases in each context is largely a function of data availability. Due to the FERC licensing process, there exists a greater degree of data available online. In addition, there exist a large number of recently-expired operating licenses for many FERC hydropower projects; these applications for relicensing have been impacted by the 1986 environmental amendments to the Federal Power Act. This is not to infer that the majority of recent dam removals are necessarily in the FERC context; there is simply more detailed and complete information currently available for this context, especially across the wide array of independent measures used in this analysis.

Bibliography

Abbey, E. 1975. *The monkey wrench gang*. Salt Lake City: Roaming the West.

AFS (American Fisheries Society). 2005. *Study report on dam removal for the AFS Resource Policy Committee*. Retrieved February 9, 2006 from https://www.fisheries.org/html/Public_Affairs/Policy_Statements/ps_32.shtml

Agrawal, A. 2000. Small is beautiful, but is larger better? In C. Gibson, M. McKean, and E. Ostrom, (Eds.), *People and forests: Communities, institutions, and governance*. Cambridge: MIT Press.

American Rivers. 1999. *Removal of the Edwards dam in Maine*. Retrieved February 9, 2006 from http://www.americanrivers.org/site/PageServer?pagename=AMR_content_fb55

_____. 2000. *Top-ten most endangered rivers, 2000: #3 Ventura River (CA)*. Retrieved June 11, 2003 from http://www.amrivers.org/mostendangered/ventura200.htm

_____. 2000a. *Paying for dam removal: A guide to selected funding sources*. Washington, DC: American Rivers.

_____. 1999. *Dam removal success stories*. Retrieved October 15, 2006 from http://www.americanrivers.org/site/PageServer?pagename=AMR_press_damremovalpublic

_____. 2001. Final Snake River plan improved. *American Rivers* 29: 5-6.

_____. 2002. Federal Columbia/Snake Salmon funding. *American Rivers* 28: 8.

_____. 2004. *Current efforts: Northwest*. Retrieved March 5, 2004 from http://www.americanrivers.org/site/PageServer?pagename=AMR_content_3251

_____. 2005a. *Dam removal today*. Retrieved March 23, 2005 from http://www.americanrivers.org/site/PageServer?pagename=AMR_content_997d

_____. 2005b. *In the news*. Retrieved on August 30, 2005 from http://www.americanrivers.org/site/News

_____. 2005c. *Army Corps reform*. Retrieved October 15, 2005 from http://www.americanrivers.org/site/PageServer?pagename=AMR_corpsreform

_____. 2006. *Hydropower dam reform*. Retrieved February 7, 2006 from http://www.americanrivers.org/site/PageServer?pagename=AMR_content_c7f4

_____. 2006a. *Elwha River Restoration.* Retrieved February 9, 2006 from http://www.americanrivers.org/site/PageServer?pagename=ps_content_c420

_____. 2006b. *Lessons learned from the Fort Edward Dam Removal.* Retrieved February 9, 2006 from http://www.americanrivers.org/site/PageServer?pagename=AMR_content_71a6

_____. 2006c. *Cushman hydroelectric project.* Retrieved February 9, 2006 from http://www.americanrivers.org/site/PageServer?pagename=ps_CushmanProject

_____. 2006d. *Matilija Dam, Matilija creek.* Retrieved May 2, 2006 from http://www.americanrivers.org/site/PageServer?pagename=AMR_content_7a3e

_____. 2006e. *Current efforts: Southwest.* Retrieved July 7, 2006 from http://www.americanrivers.org/site/PageServer?pagename=AMR_content_8b68

_____. 2006f. *Savage Rapids Dam, Rogue River, Grants Pass Oregon.* Retrieved September 10, 2006 from http://www.americanrivers.org/site/PageServer?pagename=AMR_content_3251

_____, Friends of the Earth, and Trout Unlimited. 1999. *Dam removal success stories: Restoring rivers through selective removal of dams that don't make sense.*

Andrews, R.N.L. 1976. Agency responses to NEPA: A comparison and implications. *Natural Resources Journal* 16, 301-322.

Andrus, C.D. 1998. *Cecil Andrus: Politics western style.* Seattle: Sasquatch Books.

ASDSO (Association of State Dam Safety Officials). 2006. *Resource center.* Retrieved March 28, 2005 from http://crunch.tec.army.mil/nid/webpages/nid.cfm

_____. 2006a. *Facts about dams.* Retrieved April 14, 2006 from http://www.damsafety.org/layout/subsection.aspx?groupid=13&contentid=82

_____. 2006b. *State-by-state statistics on dams and state safety regulation – Dec 2004.* Retrieved May 7, 2006 from http://www.damsafety.org/

_____. 2006c. *Origins of the Association of State Dam Safety Officials.* Retrieved May 10, 2006 from http://www.damsafety.org/

Aspen Institute. 2002. *Dam removal: A new option for a new century.* Queenstown: The Aspen Institute Publications Office.

Backus, P. 2005. Bill contains $5 million for Milltown Dam renovation. *Missoulian*, 17 July.

_____. 2006. First step in Milltown Dam removal comes with push of a button. *Missoulian*, 29 June.

Barker, E. 2000. Service says dams should stay put. *High Country News*, 22 May.

Bates, S.F., D.H. Getches, L.J. MacDonnell, and C.F. Wilkinson. 1993. *Searching out the headwaters: Change and rediscovery in western water policy*. Washington, DC: Island Press.

Baumgartner, F.R., and B.D. Jones. 1993. *Agendas and instability in American politics*. Chicago: University of Chicago Press.

Beard, D.P. 1997. "Dams aren't forever." *New York Times* 6 October: B6.

Bednarek,. 2001.

Berry, F.S., and W.D. Berry. 1999. Innovation and diffusion models in policy research. In P.A. Sabatier (Ed.), *Theories of the policy process*. Boulder: Westview Press.

Birkland, T. 1997. *After disaster: Agenda setting, public policy, and focusing events*. Washington, DC: Georgetown University Press.

Blumenthal, L. 1999. Analysis concludes breaching best for fish. *Tri-City Herald*, 15 (April):4-5.

_____. 2000. Breaching seeps into race for president. *Tri-City Herald*, 23 (July) 11 12.

Born, S., K. Genskow, T. Filbert, N. Hernandez-Mora, M. Keefer, and K. White. 1998. Socioeconomic and institutional dimensions of removals: The Wisconsin experience. *Environmental Management* 22: 359-370.

Bosso, C.J. 1987. *Pesticides and politics*. Pittsburgh: University of Pittsburgh Press.

Bowden, C. 2003. *Killing the hidden waters: The slow destruction of water resources in the American Southwest*. Austin: University of Texas Press.

Bowersox, J. 2000. From water management to water development: Federal agency opportunism in an era of policy devolution. *American Behavioral Scientist*, 44: 599-613.

BPA (Bonneville Power Administration). 2003. *Hood River Production Program Review*. Retrieved February 19, 2006 from http://www.efw.bpa.gov/Publications//A00010153-1.pdf.

Brewer, G.D., and P. de Leon. 1983. *The foundations of policy analysis*. Homewood:

Dorsey Press.

Brown, E. 2005 (September 19). Agency slashes critical habitat for salmon. *High Country News*.

Browne, W. 1995. *Cultivating Congress*: *Constituents, issues, and interests in agricultural policymaking*. Lawrence: University of Kansas Press.

Blumm, M.C. 1991. Federalism, hydroelectric licensing, and the future of minimum streamflows after *California v. FERC*. *Environmental Law* 21: 113-131.

Buck, J., operations manager, Rogue River Basin Project, US ACOE. Personal interview, August 9, 2005.

CA CC (California Coastal Conservancy). 2006. *About the Conservancy* Retrieved June 4, 2006 from http://www.coastalconservancy.ca.gov/About/about.htm

CCC (California Coastal Commission). 2006. *Program overview*. Retrieved June 4, 2006 from http://www.coastal.ca.gov/whoweare.html

CA DFG (California Department of Fish and Game) .2006. *Resources Agency: Department of Fish and Game*. Retrieved May 25, 2006 from http://www.dfg.ca.gov/

_____ . 2006a. *Native Anadromous Fish and Watershed Branch*. Retrieved May 26, 2006 from http://www.dfg.ca.gov/nafwb/index.html

CA DPLA (California Department of Planning and Local Assistance). 2006. *Department of Water Resources: Planning and Local Assistance*. Retrieved May 8, 2006 from http://www.dpla2.water.ca.gov/

_____ . 2006a. *Water Planning*. Retrieved May 8, 2006 from http://www.dpla2.water.ca.gov/dplanav.cfm?nav=Water_Planning

_____ . 2006b. *Economic analysis*. Retrieved May 8, 2006 from http://www.dpla2.water.ca.gov/dplanav.cfm?nav=Water_Planning,Economics

_____ . 2006c. *Groundwater*. Retrieved May 8, 2006 from http://www.dpla2.water.ca.gov/dplanav.cfm?nav=Water_Planning,Groundwater

_____ . 2006d. *Surface water*. Retrieved May 8, 2006 from http://www.dpla2.water.ca.gov/dplanav.cfm?nav=Water_Planning,Surface_Water

_____ . 2660e. *Water management*. Retrieved May 8, 2006 from http://www.dpla2.water.ca.gov/dplanav.cfm?nav=Water_Planning,Water_Management

_____ . 2006f. *Financial assistance*. Retrieved May 8, 2006 from http://www.dpla2.water.ca.gov/dplanav.cfm?nav=Financial_Assistance

CA RA (California Resources Agency). 2006. *Office of the Secretary*. Retrieved May 25, 2006 from http://resources.ca.gov/index.html

CA DSOD (California Division of Safety of Dams). 2005. *About the Division of Safety of Dams*. Retrieved May 8, 2006 from http://damsafety.water.ca.gov/about.htm

CA DWR (California Division of Water Resources). 2006. *History of the Department of Water Resources*. Retrieved May 8, 2005 from http://www.publicaffairs.water.ca.gov/swp/history.cfm

_____ . 2006. *Dams removed and potential impediments*. Retrieved June 1, 2006 from http://www.watershedrestoration.water.ca.gov/fishpassage/impediments/

CALFED. 2001. *Ecosystem Restoration Program Accomplishments*. Retrieved May 8, 2006 from http://calwater.ca.gov/Programs/EcosystemRestoration/Ecosystem_Accomplishments.asp

Cal/EPA (California Environmental Protection Agency). 2006. *About Cal/EPA*. Retrieved June 4, 2006 from http://www.calepa.ca.gov/About/

Carter, M. 2004 (July 26). Alameda Creek dams to be demolished. Plans for restoration of steelhead move forward. *Tri-Valley Herald*. Retrieved June 4, 2006 from http://www.tri-valleyherald.com

CFC (Clark Fork Coalition). 2002. *Why Milltown Reservoir and toxic sediments should go*. Retrieved March 9, 2006 from http://www.clarkfork.org

_____ . 2004. *Annual report*. Retrieved August 8, 2005 from http://www.clarkfork.org

_____ . 2004a. *Timeline of accomplishments*. Retrieved March 11, 2006 from http://www.clarkfork.org/about/timeline.html

Clark, B.T. 2004. Agenda setting and issue dynamics: Dam breaching on the Lower Snake River. *Society and Natural Resources* 17: 599-609.

Clarke, J.N. and D.C. McCool. 1996. *Staking out the terrain*. 2nd ed. Albany: SUNY Press.

Cobb, R.W. and C.D. Elder. 1972. *Participation in American politics: The dynamics of agenda-building*. Boston, MA: Allyn and Bacon, Inc.

Collier, M.P., R.H. Webb, and Edmund D. Andrews. 1997. "Experimental flooding in Grand Canyon". *Scientific American* (January): 82-89.

Colorado Plateau Land Use History of North America (CPLUHNA). 2005. *Water Development, extraction, and diversion.* Retrieved November 7, 2005 from http://www.cpluhna.nau.edu/Change/waterdevelopment5.htm

Congressional Record 132. 17 October 1986: 16982.

Corps Reform Network. 2005. *Who we are.* Retrieved October 15, 2005 from http://www.corpsreformnetwork.org/

COV (County of Ventura). 2005. *Department functions.* Retrieved June 7, 2006 from http://portal.countyofventura.org/portal/page?_pageid=33,140060&_dad=portal&_schema=PORTAL

_____. 2006. *Frequently asked questions (FAQs).* Retrieved June 7, 2006 from http://157.145.215.77/FAQs.html#FAQS_General_Name

Creighton, J.L. 1981. *The public involvement manual.* Cambridge: ABT Books.

Davis, C.E. 2006. Personnel communication, November, 28.

Dallman, S., and J. Edmondson. 2002. *Comments to the United States Army Corps of Engineers, Los Angeles District, Malibu Creek Environmental Restoration Feasibility Study.* Southern California Steelhead Coalition: Malibu.

De Leon, P. 1983. Policy evaluation and program termination. *Policy Studies Review* 2: 631-648.

Derthick, M. and P. Quirk. 1985. *The Politics of Deregulation.* Washington, DC: Brookings.

Devine, R.S. 1995. The trouble with dams. *Atlantic Monthly*, 276, 2 (August):64-74.

Devlin, S. 2002. *History's troubles.* Retrieved August 16, 2005 from http://www.missoulian.com/articles/2002/01/27/export5475.prt

_____. 2003. Feds issue Milltown apology. Retrieved August 16, 2005 from http://www.missoulian.com/articles/2003/01/10/export662.prt

Downing, J. 2004 (August 6). Elwha dam removal gets final go-ahead. *The Seattle Times*, 1-4.

Downs, A. 1972. Up and down with ecology: The 'issue attention cycle'. *Public Interest* 32: 38-50.

Drew, E. 1970. Dam outrage: The story of the Army Engineers. *Atlantic* April: 51-62.

Dryzek, S.J. 1997. *The politics of the earth*. Oxford: Oxford University Press.

Duewel, J. 2001. "End of GPID's legal troubles good news to Smith". *Grants Pass Daily Courier*, August 15: 6A.

_____. 2002. "Savage Rapids Dam removal bill gets new name". *Grants Pass Daily Courier*, April 27: 6A.

Eggers, R. 2005, Area Manager, Lower Columbia Area Office, US Bureau of Reclamation. Personal interview August 1, 2005.

Ehrhardt, D. 2001. "Both sides lose in battle over dam". *Rogue River Press*, August 1: 16.

Electric Consumers Protection Act of 1986. Pub. L. 99-495, 100 Stat. 1243.

Espeland, W.N. 1998. The struggle for water: *Politics, rationality, and identity in the American Southwest*. Chicago: University of Chicago Press.

Feldman, D.L. 1991. *Water resources management: In search of an environmental ethic*. Baltimore: The Johns Hopkins University Press.

FEMA (Federal Emergency Management Agency). 1998. *Model state dam safety program*. Washington, DC: FEMA.

_____. 1999. *National dam safety program*. Retrieved February 9, 2006 from http://www.fema.gov/mit/ndspweb.htm

FERC (Federal Energy Regulatory Commission). 1991. *Evaluating relicense proposals at the Federal Energy Regulatory Commission*. Washington, DC: Office of Hydropower Licensing.

_____. 2002. "Interagency task force to improve the hydropower licensing Process". Washington, DC: FERC.

_____. 2002a. Order Extending Term of License. Montana Power Company Project No. 2543-053. Federal Energy Regulatory Commission. January 31, 2002.

_____. 2003. *Hydroelectric licensing rulemaking, Order 2002*. Retrieved October 11, 2003 from http://www.ferc.gov/industries/hydropower/indus-act/hl-over.asp

_____. 2004. *Handbook for Hydroelectric Project Licensing and 5MW Exemptions*

from Licensing. Retrieved December 12, 2005 from http://www.archives.gov/federal_register/index.html

_____. 2005. *What FERC does*. Retrieved December 9, 2005 from http://www.ferc.gov/about/ferc-does.asp

_____. 2005a. *Hydropower: Jurisdiction Determination*. Retrieved on December 9, 2005 from http://www.ferc.gov/industries/hydropower/gen-info/jur-deter.asp

_____. 2005b. *History of FERC*. Retrieved on December 9, 2005 from http://www.ferc.gov/students/whatisferc/history.htm

_____. 2005c. *About FERC Offices*. Retrieved on December 12, 2005 from http://www.ferc.gov/about/offices.asp

_____. 2005d. *Industries: Exemptions from Licensing*. Retrieved on December 12, 2005 from http://www.ferc.gov/industries/hydropower/gen-info/exemptions.asp#skipnavsub

_____. 2006. *Projects near you: Northwest Region*. Retrieved July 14, 2006 from http://www.ferc.gov/for-citizens/projectsearch/SearchProjects.aspx

Freejohn, J.A. 1974. *Pork barrel politics: Rivers and Harbors Legislation, 1947-1968*. Stanford: Stanford University Press.

Freeman, J.L. 1965. *The political process: Executive bureau-legislative committee relations*, rev.ed. New York: Random House.

Freeman, M. 2003 (March 7). Corps plans fish trap at Elk Creek Dam. *Mail Tribune*. Retrieved March 7, 2006 from http://www.mailtribune.com/cgi-bin/p/safe/psafe.pl

Friends of the River, 2000. *Rivers reborn: Removing dams and restoring rivers in California*. Retrieved March 8, 2006 from http://www.friendsoftheriver.org/site/DocServer/RiversReborn.pdf?docID=224&AddInterest=1004

FOTR (Friends of Two Rivers). 2005. *About us*. Retrieved August 26, 2005 from http://www.friendsof2rivers.org/aboutus.htm#mission

Garnsey, M.E. 1952. Water: West. *Annals of the American Academy of Political and Social Science*, 281: 163-171.

Gertsch, W.D. 1986. Contours of change: Water resources allocation and economic stability in the Snake River Basin. *Idaho Yesterdays* 30:1-2.

Goetzman, W. 1959. *Army exploration in the American West: 1803-1863*. New Haven:

Yale University Press.

Goodman, M.L. 1990. Preserving the genetic diversity of salmonid stocks: A call for federal regulation of hatchery programs. *Environmental Law* 20: 111-166.

GPID (Grants Pass Irrigation District). 2001. *Press Release: July 24, 2001.* Grants Pass: Grants Pass Irrigation District.

_____. 2002. *Savage Rapids Dam.* Grants Pass: Grants Pass Irrigation District.

_____. 2006. Grants Pass Irrigation District: Savage Rapids Dam. Retrieved September 28, 2006 from http://www.gpid.com/QandA.htm

Grimm, L.T. 1990. Fishery protection and FERC hydropower relicensing under ECPA: maintaining a deadly status quo. *Environmental Law* 20: 929-973.

Grossman, E. 2002. *Watershed: The undamming of America.* New York, NY: COUNTERPOINT.

Hardin, G. 1968. The tragedy of the commons. *Science* 162, December: 1243-1248.

Harvey, M.W.T. 1994. *A symbol of wilderness.* Albuquerque: University of New Mexico Press.

Heinz Center. 2002. *Dam removal: Science and decision- making.* Washington, DC: The H. John Heinz III Center for science, economics, and the environment.

Hilborn, R. 1992. Hatcheries and the future of Northwest salmon. *Fisheries* 17: 5-8.

Hird, J.A. 1991. The political economy of pork: Project selection at the US Army Corps of Engineers. *American Political Science Review*, 85: 429-456.

Ho, D. 2006. "Energy's new spin." *Times Argus.* 22 May.

HRC (Hydropower Reform Coalition). 2001. *Stranded midstream: Cause and consequence of hydropower regulatory delay.* Washington, DC: Hydropower Reform Coalition.

_____.2004. *Star Falls: Snake River, Idaho.* Retrieved March 23, 2005 from http://hydroreform.org/northwestaccomplished.asp?ARTICLE12558=25393

_____. 2005. *Hydro relicensing toolkit.* Retrieved December 9, 2005 from http://www.hydroreform.org/Players.asp

_____. 2005a. *Coalition leaders file lawsuit: Utilities can now do "even less to safeguard our rivers".* Retrieved February 16, 2006 from http://www.hydroreform.org/news-archive.asp?ARTICLE11952=31793

_____. 2005b. *Congress passes final energy bill.* Retrieved February 16, 2006 from http://www.hydroreform.org/newsarchive.asp?ARTICLE11952=28228&PG11952=2

_____. 2005c. *Integrated licensing process.* Retrieved February 16, 2006 from http://www.hydroreform.org/ILP.asp

_____. 2006. *Citizen toolkit for effective participation in hydropower relicensing.* Retrieved January 29, 2006 from http://www.hydroreform.org/EPA.asp

_____. 2006a. *Current news and ongoing results.* Retrieved February 7, 2006 from http://www.hydroreform.org/results-archive.asp

_____. 2006b. *Hydropower and the Federal Energy Bill* Retrieved February 14, 2006 from http://www.hydroreform.org/energybill.asp

_____. 2006c. *Policy updates.* Retrieved February 14, 2006 from http://www.hydroreform.org/policy-updates.asp?ARTICLE4781=31793

_____. 2006d. *US Supreme Court takes Clean Water Act case on Maine dams.* Retrieved on February 16, 2006 from http://www.hydroreform.org/news-archive.asp?ARTICLE11952=30729

Hunter, R.G. 1998. Water diversions and salmon: Pressure mounts to remove Savage Rapids Dam. *Western Water Law & Policy Reporter*, December: 29-34.

_____. 2002 (September 15). Elk Creek Dam: Good money after bad. *Medford Mail Tribune.* Retrieved March 7, 2005 from http://www.onrc.org/press/046.elkcreekdam2.html

_____, staff attorney, WaterWatch of Oregon, Southern Oregon Office. Personal interview, August 8, 2005.

_____. 2005a. *Reflections on the Savage Rapids Dam debate.* Medford: Waterwatch.

ICLD (International Commission on Large Dams). 2006. *What is the definition of a large dam?* Retrieved March 8, 206 from http://209.225.62.100/water/topics/dams/dams0120.asp

IRN (International Rivers Network). 2001. *River Revival Bulletin*, No. 30. (October 22). Electronic Bulletin.

_____. 2006. *River Revival Bulletin*, No. 75 (May 31). Electronic Bulletin.

_____. 2006a. *River Revival Bulletin*, No. 77 (August 4). Electronic Bulletin.

_____. 2006b. *River Revival Bulletin*, No. 78 (September 29). Electronic Bulletin.

International Development Studies Network (ISDN). 2005. *Dams in development: Perspectives*. Retrieved November 7, 2005 from http://www.idsnet.org/Resources/Dams/Development/DinD.html?Dam+Icon.x=17&Dam+Icon.y=20

Jacobson, L. 1998. *Dammed if you do, dammed if you don't*. Accessed October 7, 1999 from http://www.govexec.com/dailyfed/1098/100598t1.htm

Jones, B.D. 1994. *Reconceiving decision-making in democratic politics: Attention choice, and public policy*. Chicago: University of Chicago Press.

Kerwin, C.M. 1990. Transforming regulation: A case study of hydropower licensing. *Public Administration Review* (January/February).

Kingdon, J. 1995. *Agendas, alternatives, and public policies*, 2nd Ed. New York, NY: HarperCollins.

Klatte, B., fisheries biologist, US ACOE. Personal interview, August 2, 2005.

Kollgaard, E.B., and W.L. Chadwick (eds.). 1988. *Development of dam engineering in the United States*. Prepared in Commemoration of the 16th Congress of the International Commission on Large Dams by the US Committee on Large Dams. New York: Pergamon Press.

Lamb, K. 2002. *The value of Reclamation: A historical overview of public involvement*. Retrieved November 2, 2005 from www.usbr.gov/history/Symposium_June2002/Reclamation%20(D)/PDF'S/Lamb,%20Kara.pdf

Larmer, P. 1999. Unleashing the Snake. *High Country* News, 20 (December): 4-6.

Law, C. 1994. *Geotechnical exploration and testing of sediments stored behind Rindge Dam on Malibu Creek*. California Department of Fish and Game: Sacramento.

League of Conservation Voters. 2002. *Dam relicensing* (On the motion to table, 4/24/02, Senate Roll Call No. 81, 107th Congress, 2nd Session). Retrieved October 7, 2003 from

http://www.capwiz.com/lcv/issues/votes/?votenum=81&chamber=S&congress=1072

Lee, K.N. 1993. *Compass and Gyroscope.* Washington, DC: Island Press.

Lee, M. 1998. Breaching dams would revive Chinook. *Tri-City Herald*, 18 (August):3.

_____. 1999. Congress members spotlight salmon. *Tri-City Herald*, 5 (August):4.

Lester, J.P. 1994. A new federalism? Environmental policy in the states. In N.J. Vig M.E. Kraft (Eds.), *Environmental policy in the 1990s* (2nd ed.). Washington, DC: CQ Press.

_____, and J. Stewart, Jr. 2000. *Public policy: An evolutionary approach*, 2nd Ed. Belmont: Wadsworth/Thompson Learning.

Lindblom, C. E. 1959. The science of muddling through. *Public Administration Review*, 19, 79-88.

LOC (Library of Congress). 2006. *Senate Report 109-274 - ENERGY AND WATER APPROPRIATIONS BILL, 2007.* Retrieved September 12, 2006 from http://thomas.loc.gov/cgibin/cpquery/?&dbname=cp109&sid=cp109DOpqK&refer=&r_n=sr274.109&item=&sel=TOC_434569&

_____ . 2006a. *To authorize the conduct of small projects for the rehabilitation or removal of dams.* Retrieved September 12, 2006 from http://thomas.loc.gov/cgi-bin/query/D?c109:3:./temp/~c109PTdwet::

Lowry, W. 2003. *Dam politics: restoring America's rivers.* Washington, DC: Georgetown University Press.

Lubell, M., M. S. Schneider, J. T. Scholz; and M. Mete 2002. Watershed partnerships and the emergence of collective action institutions. *American Journal of Political Science* 461: 148-163.

Maass, A.A. 1950. Congress and water resources. *American Political Science Review*, 44: 576-593.

_____ . 1951. *Muddy Waters.* Cambridge: Harvard University Press.

Mail Tribune. 2005. Bill includes $6 million for local projects. *Mail Tribune.* Retrieved July 23, 2005 from http://www.mailtribune.com/cgi-bin/p/psafe/psafe.pl

Mann, D.E. 1975. Political incentives in US water policy: Relationships between distributive and regulatory politics. In D. Dresang and M. Holden (eds.) *What government does.* Beverly Hills: Sage Publications.

Matson, G., and Judy Matson, founders and current board members, Friends of Two Rivers. Personal interview, July 30, 2005.

Marston, E. (1995, July 24). A progressive bureaucrat signs off. *High Country News*, 6-9.

Martin, R. 1999. *A story that stands like a dam: Glen Canyon and the struggles for the soul of the West.* Salt Lake City: University of Utah Press.

Matthews, C. 1988. *Hardball: How politics is played – Told by one who knows the game.* New York: Summit Books.

Mazmanian, D.A., and J. Nienaber. 1979. *Can organizations change?* Washington, DC: Brookings Institution.

McCool, D. 1987. *Command of the waters.* Berkeley: University of California Press.

_____. 2004. As dams fall, a chance for redemption. *High Country News*, June 21.

McCully, P. 1996. *Silenced rivers: The ecology and politics of large dams.* New Jersey: Zed Books.

McEwan, D., and T.A. Jackson. 1996. *Steelhead restoration and management plan for California.* Sacramento: State of California.

McPhee, J. 1971. *Encounters with the Archdruid.* New York: Farrar, Straus, and Giroux.

McQuillan, J. 2005. Knocking opportunity. *Missoula Independent*, October 7.

MDERP (Matilija Dam Ecosystem Restoration Project). 2006. *Facts and history.* Retrieved May 2, 2006 from http://www.matilijadam.org/facts.htm

_____. 2006a. *A dam past its prime.* Retrieved May 2, 2006 from http://www.matilijadam.org/

_____. 2005. *Matilija Dam Ecosystem Restoration Project: Project Management plan design phase.* Los Angeles: US Army Corps of Engineers, South Pacific Division, Los Angeles District.

_____. 2004. *Matilija Dam: Final feasibility report.* Ventura: VCWPD.

Meffe, G. 1992. Techno-arrogance and halfway technologies: Salmon hatcheries on the Pacific Coast North America. *Conservation Biology* 6: 350-354.

MRA (Montana River Action). 2004. *MRA state of the State's rivers 2004*. Retrieved March 9, 2006 from www.montanariveraction.org/media/MRA-Winter2004.pdf

Muchow, D.J., and W.A. Mogel. 1996. *Energy Law and Transactions*. Albany: Matthew Bender.

Myers, N., and J. Kent. 2001. *Perverse subsidies: How misused tax dollars harm the environment and the economy*. Washington, DC: Island Press.

National Academy of Sciences. 2001. *Inland navigation system planning: The upper Mississippi River-Illinois waterway*. Washington, DC: National Academy Press.

National Research Council, National Academy of Sciences. 1998. *Upstream Salmon and society in the Pacific Northwest*. Washington, DC: National Academy Press.

New Mexico Center for Wildlife Law. 2006. *Federal wildlife and related laws handbook*. Accessed February 2, 2006 from http://ipl.unm.edu/cwl/fedbook/index.html

Needham, J. 1971. *Science and civilization in China*, Vol. 4, Pt. 3. Cambridge: Cambridge University Press.

Nelson, B. 1984. *Making an issue of child abuse*. Chicago: University of Chicago Press.

NHA (National Hydropower Association). 2006. *Hydro licensing*. Retrieved January 29, 2006 from http://www.hydro.org/hydrofacts/licensing.asp?t1=index.asp&n1=Hydro+Facts

Nichols, P.D., N.K. Murphy, and D.S. Kenney. 2001. Water and growth in Colorado: A review of legal and policy issues. Boulder: Natural Resources Law Center.

Nielsen, P., environmental health specialist, Missoula City – County Health Department. Personal interview July 29, 2005.

Nijhuis, M. 1998. "Locals stand behind an aging dam". *High Country News*, 22 June.

NPDP (National Performance of Dams Program). 2006. *US dam trivia*. Retrieved April 14, 2006 from http://npdp.stanford.edu/ustrivia.html

NPS (US National Park Service). 2006. *Rogue (upper) River, Oregon*. Retrieved September 14, 2006 from http://www.nps.gov/rivers/wsr-rogue-upper.html

ONRC (Oregon Natural Resources Council). 2005. *FACT SHEET: Elk Creek Dam*. Retrieved July 27, 2005 from http://www.onrc.org/info/elkcreekdam/factsheet.html

Orr, C.H., B.M. Roth, K.J. Forshay, J.D. Gonzales, M.M Papenfus, and R.D.G. Wassell. 2004. Examination of physical and regulatory variables leading to small dam removal in Wisconsin. *Environmental Management* 33: 99-109.

Ortolano, L., 1993, Controls on project proponents and environmental impact assessment effectiveness. *The Environmental Professional* 15: 352-363.

Ostrom, E. 1990. *Governing the Commons*. Cambridge: Cambridge University Press.

_____. 2001. Reformulating the commons. In J. Burger, E. Ostrom, R. Norgaard, D. Policansky, and B. Goldstein (Eds.), *Protecting the commons*. Washington, DC: Island Press.

Palmer, T. 2004. *Endangered rivers and the conservation movement*, 2nd Ed. Berkeley: University of California Press.

Payne, T.R. and Associates. 2003. *Assessment of steelhead habitat in Upper Matilija Creek Basin, Stage I: Qualitative Stream Survey.* Arcata: Thomas R. Payne and Associates.

Pejchar, L., and K. Warner. 2001. A river might run through it again: criteria for consideration of dam removal and interim lessons from California. *Environmental Management* 28:561-575.

PGE (Pacific General Electric Company). 2002. *Decommissioning plan for the Bull Run Hydroelectric Project – FERC Project No.477.* Filed with the FERC Office of Hydropower Licensing, Washington, DC.

Polsby, N.W. 1984. *Political innovation in America: The politics of policy initiation.* New Haven: Yale University Press.

Pope, C. 1987. Undamming Hetch Hetchy. *Sierra* (November/December): 34-38.

_____. 1999. Deconstructing dams: A watershed for Congress? Washington, DC: *CQ Weekly*, 17 (July): 1707-10.

Pressman, J.L., and A. Wildavsky. 1984. *Implementation.* Berkley: University of California Press.

Pross, E.L. 1938. *A history of Rivers and Harbors Appropriation Bills*, 1866-1933. Unpublished Ph.D. dissertation. Ohio State University.

Reisner, M., and S. Bates. 1990. *Overtapped oasis: Reform or revolution for western water.* Washington, DC: Island Press.

Reisner, M. *Cadillac desert*. New York: Penguin Books.

Reuss, M. 1992. Coping with uncertainty: Social scientists, engineers, and federal water planning. *Natural Resources Journal*, 32: 101-135.

_____. 2004. The development of American Water Resources: Planners, politicians, and constitutional interpretation. In J. Trottier and P. Slack, eds., *Managing water resources: Past and present*. Oxford: Oxford University Press.

Richardson, E. 1973. *Dams, parks, & politics: Resource development and preservation in the Truman-Eisenhower era*. Lexington: The University Press of Kentucky.

Rinquist, E. 1994. *Environmental protection at the state level: Politics and progress in controlling pollution*. New York: M.E. Sharpe.

River Network. 2001. *Riverinfo*, July 25, 2001. Retrieved on December 6, 2005 from http://rapids.rivernetwork.org/pipermail/riverinfo/2001-July/000117.html

Rochefort, D.A. and R.W. Cobb (ed). 1994. *The politics of problem definition: shaping the policy agenda*. Lawrence: University Press of Kansas.

Roodman, D.M. 1997. Getting the signals right: Tax reform to protect the environment and the economy. *Worldwatch Paper #134*. Washington, DC: Worldwatch Institute.

Rogers, Everett. 1995. *Diffusion of innovations*, 4th Ed.. The Free Press: New York.

Rosenbaum, W.A. 2005. *Environmental politics and policy*, 6th Edition. Washington, DC: CQ Press.

Rourke, F.E. 1984. *Bureaucracy, politics, and public policy*, 3rd Edition. Boston: Little, Brown.

Sabatier, P.A. 1988. An advocacy coalition framework of policy change and the role of policy oriented learning therein. *Policy Studies* 21:129-168.

_____. 1993. An advocacy coalition framework of policy change and the role of Policy-oriented learning therein. *Policy Sciences* 21: 129-168.

_____ and H. Jenkins-Smith (eds). 1993. *Policy change and learning: An advocacy coalition approach*. Boulder: Westview Press.

_____. 1999. "The Advocacy Coalition Framework: An assessment". In Paul A. Sabatier, ed., *Theories of the Policy Process*. Boulder: Westview Press.

Sabatier, P.A., and D. Mazmanian. 1980. The implementation of public policy. *Policy Studies Journal* 8: 538-560.

Schattschneider, E. E. 1960. *The semi-sovereign people: A Realist's view of democracy in America*. New York: Holt, Rinehart and Winston.

Scheberle, D. 1994. Radon and asbestos: A study of agenda setting and causal stories. *Policy Studies Journal* 22: 74-86.

_____. 1997. *Trust and the politics of implementation: Federalism and environmental policy*. Washington, DC: Georgetown University Press.

Schlager, E. 1999. "A comparison of frameworks, theories, and models of the policy process", in Paul A. Sabatier, ed., *Theories of the Policy Process*. Boulder: Westview Press.

SEJ (Society of Environmental Journalists). 2003. *FERC keeps a safety secret* (February 12). Retrieved August 16, 2005 from http://notes.sef.org/

Selznick, P. 1949. *TVA and grassroots*. Berkeley and Los Angeles: University of California Press.

Shapovalov, L. and A. C. Taft. 1954. The life histories of the steelhead rainbow trout (Salmo gairdneri) and silver salmon (Oncorhynchus kisutch) with special reference to Waddell Creek, California, and recommendations regarding their management, No. 98. Sacramento: California Department of Fish and Game, Fish Bull.

Smythe, W.E. 1900. *The conquest of arid America*. New York: Harper & Brothers.

State of California. 2005. *The California Environmental Quality Act*. Retrieved June 10, 2006 from http://ceres.ca.gov/topic/env_law/ceqa/more/faq.html

State of Montana. 2002. Appendix *C: Potential resources for funding and technical assistance*. Retrieved August 26, 2005 from http://travelmontana.state.mt.us/Strategic%20Plan%20Final/Final_Word/Appendix%20C_Resources%20FINAL.doc

Stevens, L. 1983. *The Colorado River in Grand Canyon: A guide*. Flagstaff: Red Lake Books.

Stone, D. 1997. *Policy paradox: The art of political decision-making*. New York, NY: W.W. Norton & Company.

Stone-Manning, T., executive director, Clark Fork Coalition. Personal interview July 28, 2005.

_____, and E. Miller. 2002. *The river we carry with us – Clark Fork stories.* Livingston: Clark City Press.

Tang, S.Y. 1992. *Institutions and collective action: Self-governance in irrigation.* San Francisco: Institute for Contemporary Studies Press.

Taxpayers for Common Sense. 2000. *Snake River campaign.* Retrieved April 3, 2001 from http://www.taxpayer.net/snake

_____ . 2005. *CorpsWatch campaign.* Retrieved October 15, 2005 from http://www.taxpayer.net/corpswatch/index.htm

Taylor, S. 1984. *Making bureaucracies think: The environmental impact statement strategy of administrative reform.* Stanford: Stanford University Press.

TPU (Tacoma Public Utilities). 2005. *Hydro Licensing: Cowlitz River Project: Licensing Documents.* Retrieved July 13, 2006 from http://www.ci.tacoma.wa.us/power/parksandpower/hydro_licensing/cowlitz/docs/docs_studies.htm

Trout Unlimited. 2005. *Groups sue federal government over new dam relicensing rules.* Retrieved February 14, 2006 from http://www.tu.org/site/apps/s/content.asp?c=7dJEKTNuFmG&b=1153185&ct=1744791

TVA (Tennessee Valley Authority). 2006. *Energy, environment, economic development.* Retrieved March 28, 2006 from http://www.tva.gov/index.htm

US Army. 2005. *Organization.* Retrieved September 16, 2005 from http://www.army.mil/organization/

US ACOE (US Army Corps of Engineers). 2000. *Malibu Creek Environmental Restoration Project Study Plan.* US ACOE: Los Angeles District.

_____ . 2002. *Who we are.* Retrieved February 11, 2005 from http://www.usace.army.mil/who.html

_____ . 2002a. *Lower Snake River juvenile salmon migration feasibility report and environmental impact statement.* Walla Walla: Department of the Army, Walla Walla District Corps of Engineers.

_____ . 2003. *Environmental operating principles.* Retrieved March 21, 2005 from http://www.hq.usace.army.mil/cepa/envprinciples.htm

_____. 2003a. *Ecosystem Management and Restoration Research Program.* Retrieved September 16, 2005 from http://el.erdc.usace.army.mil/emrrp/progsum.html

_____. 2004. *Dam removal.* Retrieved March 21, 2005 from http://www.nww.usace.army.mil/lsr/Dam_Removal/default.htm

_____. 2004a. *Environmental laboratory: What we provide.* Retrieved September 16, 2005 from http://el.erdc.usace.army.mil/provide.cfm

_____. 2005. *US Army Corps of Engineers: Brief history.* Retrieved September 12, 2005 from http://www.hq.usace.army.mil/history/brief.htm#1beg

_____. 2005a. *US Army Corps of Engineers: Did you know?* Retrieved February 11th, 2005 from http://www.hq.usace.army.mil/history/vignettes/vignette_9.htm

_____. 2005b. *US Army Engineer Research and Development Center.* Retrieved October 13, 2005 from http://www.erdc.usace.army.mil/

_____. 2005c. *National Inventory of Dams.* Retrieved August 8, 2006 from http://crunch.tec.army.mil/nid/webpages/nid.cfm

_____. 2006. *Elk Creek Project.* Retrieved March 2, 2006 from https://www.nwp.usace.army.mil/op/R/p_elkcrk.asp

_____. 2006a. *US Army Corps of Engineers: San Francisco District.* Retrieved July 12, 2006 from http://www.spn.usace.army.mil/siteindex.html

US BOR (United States Bureau of Reclamation). 1972. *Central Arizona Project: Final Environmental Impact Statement.*

_____. 1976. *Draft Environment Impact Statement: Orme Dam Reservoir, Central Arizona Project, Arizona – New Mexico.*

_____. 1977. *Grants Pass Project.* Portland: Pacific Northwest Region, Water and Power Resources Service.

_____. 1987. *Assessment '87...A New Direction for the Bureau of Reclamation. Bureau of Reclamation, U.S. Department of the Interior.* Denver: US Government Printing Office.

_____. 1992. *Strategic Plan: A Long-term Framework for Water Resources Management, Development, and Protection.* Denver: US Government Printing Office.

_____. 1995. *Fish Passage Improvements at Savage Rapids Dam: Final Environmental Impact Statement.*

_____. 2000. *NEPA Handbook Public Review.* Retrieved March 23, 2005 from http://www.usbr.gov/nepa/index.htm

_____. 2004. *Reclamation's FY 2005 Budget Request is $956.3 Million.* Retrieved December 7, 2005 from http://www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=267

_____. 2005. *US Bureau of Reclamation: A very brief history.* Retrieved October 31, 2005 from http://www.usbr.gov/history/borhist.htm

_____. 2005a. *Reclamation: managing water in the West. Overview 2005 Pacific Northwest Region.* Boise: Pacific Northwest Regional Office, Office of Public Affairs.

_____. 2005b. *Pick – Sloan Missouri Basin Program.* Retrieved November 9, 2005 from http://www.usbr.gov/dataweb/html/psmbp.html

_____. 2005c. Glen *Canyon Dam.* Retrieved November 15, 2005 from http://www.usbr.gov/dataweb/dams/az10307.htm

_____. 2005d. *Teton Basin Project: Lower Teton Division – Idaho.* Retrieved November 22, 2005 from http://www.usbr.gov/dataweb/html/teton1.html

_____. 2005e. *Commissioners of Reclamation.* Retrieved December 5, 2005 from http://www.usbr.gov/history/commiss.htm

_____. 2005f. *Resource Management and Planning.* Retrieved December 5, 2005 from http://www.usbr.gov/pmts/planning/

_____. 2005g. *Reclamation Programs and Activities: Pacific Northwest Region.* Retrieved December 5, 2005 from http://www.usbr.gov/pn/programs/index.html

_____. 2006. *Grants Pass Project, Oregon.* Retrieved September 12, 2006 from http://www.usbr.gov/dataweb/html/grantspass.html

US DC (United States District Court, for the District of Oregon). 2001. *Consent Decree.* US DC: Portland.

US EPA (US Environmental Protection Agency). 2003. *Superfund Program Clean-Up Proposal: Milltown Reservoir Sediments Operable Unit of the Milltown Reservoir / Clark Fork River Superfund Site.* Helena: Montana Department of Environmental Quality.

_____. 2005. Press *Release: $100 million settlement reached for cleanup of the Milltown Reservoir.* Retrieved March 10, 2006 from http://www.epa.gov/region8/superfund/sites/mt/milltowncfr/home.html

_____. 2006. *How sites are placed on the NPL.* Retrieved March 9, 2006 from http://www.epa.gov/superfund/programs/npl_hrs/nplon.htm

US FWS (United States Fish and Wildlife Service). 1998. *Economic analysis for hydropower project relicensing: Guidance and alternative methods.* Retrieved February 7, 2006 from http://www.fws.gov/policy/hydroindex.htm

_____, Division of Congressional and Legislative Affairs. 2005. *Resource laws.* Retrieved October 15, 2005 from http://www.fws.gov/laws/lawsdigest/reslaws.html

_____. 2006. *U.S. Fish & Wildlife Service Strategic Cost & Performance Management Website.* Retrieved February 1, 2006 from http://www.fws.gov/planning/abc/

Washington Department of Ecology. 2007. Press Release. *For immediate release – March 7, 2007 07-048 – Ecology issues major decision in Elwha dam removal project.*

Water Education Foundation. 2002. *Western water magazine*, May/June 2002. Retrieved December 6, 2005 from http://www.water-ed.org/mayjune02.asp

WaterWatch. 2002. *WaterWatch news update.* Spring Issue, 2002. Retrieved July 23, 2005 from http://www.waterwatch.org

_____. 2005. *Waterwatch news update.* Winter Issue, 2005. Retrieved September 12, 2006 from http://www.waterwatch.org

WDFD (Washington Department of Fish and Wildlife). 2000. *Agreement reached to remove Goldsborough Dam to benefit salmon.* Retrieved July 12, 2006 from http://wdfw.wa.gov/do/newreal/release.php?id=aug0200a

Weber, M. 1968. *Economy and society: An outline of interpretive sociology.* New York: Bedminster Press.

Webster, J., office administrator, Grants Pass Irrigation District. Personal Interview, August 8, 2005.

Wichelman, A.F. 1976, Administrative agency implementation of the National Environmental Policy Act of 1969: A conceptual framework for explaining differential response. *Natural Resources Journal* 16, 263-300.

Wilkinson, C.F. 1992. *Crossing the next meridian: Land, water, and the future of the West*

Wilson, J.Q., editor. 1980. *The Politics of Regulation*. New York: Basic Books, Inc.

(WCD) World Commission on Dams. 2000. *Dams and development: A new framework For decision-making, The Report of the World Commission on Dams*. London: Earthscan Publications.

Worster, D. 1985. *Rivers of Empire: Water, Aridity, and the Growth of the American West*. New York: Oxford University Press.

WREP (Watershed Research and Education Program). 2006. *Fossil Creek watershed and riparian restoration*. Accessed February 13, 2006 from http://watershed.nau.edu/fossilcreekproject/fishrestoration.htm

Wright, D.S. 1978. *Understanding intergovernmental relations*. North Scituate: Duxbury Press.

WSJ (*Wall Street Journal*). 2001. Dangerous waters – all agree arsenic kills; the question is how much it takes to do so." Peter Waldman, Staff Writer. April 19, 2001.